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ABSTRACT

Results from one of a series of cooperative projects to study public access to online catalogs are discussed. This report focuses on a survey of 1,152 users and 1,315 non-users of six computer systems at seven libraries, with library participants including (1) Claremont Colleges Library, which uses the Claremont Total Library System; (2) the Evanston Public Library, which uses the CL Systems, Inc., LIBS 100 touch screen terminal public access catalog; (3) the Minnesota State University online union catalog developed at Mankato State University; (4) Pikes Peak Regional Library, which uses an in-house developed computer system called Maggie's Place; (5) Steven F. Austin State University, which uses a DataPhase Systems, Inc., turnkey circulation system; and (6) the West Valley Joint Community College District whose two community college campuses share a Universal Library Systems (ULISYS) turnkey circulation system. Recommendations to improve the online catalog, specifically in the area of user-computer interface, are presented. Twenty-seven references are included and 37 exhibits display study-related information. (Author/LMM)

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A STUDY OF SIX
ONLINE PUBLIC ACCESS CATALOGS:
A REVIEW OF FINDINGS

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

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A Final Report

by

Joseph R. Matthews

Submitted to

THE COUNCIL ON LIBRARY RESOURCES
Washington, D.C. 20036

November 1982

Submitted by

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DEDICATION

This final report is dedicated to the 1,152 individuals and the 1,315 people who respectively completed a self-administered user and non-user questionnaire. It is anticipated that future users of online catalogs will experience greater success and fewer frustrations than the individuals who shared their experiences and reactions with us.

NOTE TO THE READER

This is one of several project reports for this study to be submitted to the Council on Library Resources under separate grant and contract proposals. Reports will also be submitted by:

THE LIBRARY OF CONGRESS, PLANNING OFFICE
ONLINE COMPUTER LIBRARY CENTER, INC.
RESEARCH LIBRARIES GROUP, INC.
UNIVERSITY OF CALIFORNIA, OFFICE OF THE ASSISTANT VICE-PRESIDENT FOR LIBRARY PLANS AND POLICIES

The Data Collection Manual and Sampling Plan (March 1982), produced by the Research Libraries Group and the Data Analysis Plan (August 1982) produced by the University of California have been submitted to the Council as separate reports.

All reports will be available through the ERIC information service.

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The data collected in the seven libraries participating in the J. Matthews and Associates, Inc. portion of the CLR Online Public Access Project was coordinated and supervised by Adrienne Long at The Claremont Colleges, Trarie Kottkamp at the Evanston Public Library, Mary Hoffman at the Mankato State University, Lynn Magrath at the Pikes Peak Library District, Mary Dunn at the Stephen F. Austin State University, and Mary Hoeber at the West Valley Joint Community College District.

Joe Matthews

EXECUTIVE SUMMARY

During 1981-1982 the Council on Library Resources (CLR) funded a series of cooperative projects to study public access online catalogs. The organizations participating in the CLR Online Public Access Study were: J. Matthews and Associates, Inc.; The Library of Congress, Planning Office; Online Computer Library Center, Inc. (OCLC); Research Libraries Group, Inc. (RLG); and the University of California, Office of the Assistant Vice-President for Library Plans and Policies. Rather than a summary of the data, this executive summary focuses on the summary implications that logically follow from the data analysis.

Six computer systems and seven libraries were participants in the J. Matthews and Associates, Inc. (JMA) portion of the CLR Online Public Access Study. These seven library participants included: Claremont Colleges Library which uses the Claremont Total Library System (developed by Claremont staff; a revised version will be marketed by OCLC); the Evanston Public Library which uses the CL Systems, Inc. LIBS 100 touch screen terminal public access catalog; the Minnesota State University online union catalog, which was developed at Mankato State University; Pikes Peak Regional Library, which uses their own in-house developed computer system called Maggie's Place; Stephen F. Austin University which uses a DataPhase Systems, Inc. turnkey circulation system; and the West Valley Joint Community College District whose two community college campuses - Mission College and West Valley College share a Universal Library Systems (ULISYS) turnkey circulation system. For the purpose of this analysis, respondents from Mission and West Valley Colleges have been grouped together.

The underlying focus of this cooperative research project was the interface between the human user of the online catalog terminal and the computer system which supports and responds to the user's request for information. The data collection methodology focused upon two groups of individuals and utilized self-administered questionnaires. The first were *the users* of the online public access catalog. The second group were users of the library who were *non-users* of the online public access catalog. A total of 1,152 user and 1,315 non-user questionnaires were completed. The response rates for both the user and non-user survey's averaged 46.5 percent and 62.2 percent, respectively.

An individual at the online catalog terminal, *the user,* is using the online catalog to answer one or more questions, *the task*. The user searches the computer catalog (*the database*) using a terminal linked to the *computer system*. *The organizational interface*, typically a library, provides terminals, furniture and lighting, staff assistance and printed aids for training and orientation of the user.

The human-computer interface is the focus of the interactive communication between the catalog user and the computer system and includes commands, displays, messages, and a means to access the online catalog database through indexes stored in the computer system. The human-computer interface has to be both a link with the required facilities to allow user to accomplish a set of tasks at the computer catalog and a barrier protecting the user from contacts with other technical (confusing) facets of the computer system.

A desirable objective for any online catalog is to create a human-computer interface that is "user-friendly" or "user-cordial". The purpose of a user-cordial interface is to make the total interaction between the user and the computer system as easy and productive as possible.

The User of the Online Catalog

The typical user is a young, well-educated, male adult who frequents the library on a fairly regular basis. Familiarity with and prior use of computer technology is not a dominant characteristic of the computer catalog user. Within academic libraries, the user of the online catalog is attempting to meet the needs of course related work. Slightly over three-fourths of the public library users are at the computer catalog for personal interest or recreational uses.

In terms of age, the majority of the non-users are slightly older than the user (between the ages of 20-34). Non-users of the computer catalog report that the reasons for their non-use include: have not taken the training; no need to use any library catalog; and no time to learn to use the online catalog. One-fourth of the non-users reported they did not know there was a computer catalog and some 14 percent claimed they did not know where the online catalog was located.

Users of the computer catalog expect to do more subject searches than has been possible with card, book or COM catalogs. Users also feel that they bring complete information about a subject heading, title or author's name. Given that over half the users arrive at the online catalog with either a subject heading or topic word or words, the provision of term or keyword searching may be a mandatory requirement for a "successful" online catalog.

Until a great deal more research is completed about the user of an interactive computer-based system, and the problem-solving skills resident in most people are better understood, designers of online catalogs must recognize the "unchangeableness" of the user and provide several ways or methods for easily using online catalogs.

Any online catalog marketing campaign should take advantage of the perceptions of non-users by emphasizing: 1) no formal training is necessary to learn to use the online catalog; 2) the short period of time necessary to learn basic skills; 3) the improved information retrieval capabilities of the online catalog; and 4) the location of the computer catalog terminals. Personal testimonials by influential students, faculty, and community leaders would also likely be effective.

The Organizational Interface

Libraries with installed computer catalogs have done a relatively good job of addressing the organizational interface issues. The majority of users simply observe the terminal in the library and learn to use the computer catalog by themselves, using the printed instructions provided by the library via brochures or signs or the instructions displayed on the terminal screen itself. And when users need help, they turn most frequently to printed materials and by asking the computer catalog for "HELP."

Thus, there is a real need for the library to provide clear instructions on how to use the computer catalog and how the user can solve problems encountered during a search. These instructions are needed in a printed form and also should be displayed on the terminal screen itself. The text layout or format for the presentation of this explanatory information should be different for the printed and video media. In addition to brochures, a summary command chart affixed to the terminal is a feature frequently requested by users.

However, nearly one-fourth of the users learned to use the online catalog with the asistance of library staff members but users turned less frequently to staff when they encountered problems. Libraries with online catalogs must devise a coordinated program, perhaps using a slide tape or video tape program, to aid in assisting library patrons in learning to use the computer catalog.

Libraries must address the issue of support furniture for online catalog terminals. To date, terminals are typically placed on existing furniture with little thought of the needs of the user, e.g., privacy and comfort, or of the requirements of the terminal itself. The need for adequate writing space on both sides of the terminal is a prime consideration.

The Computer System

The terminals included in this study contributed few problems for users of the online catalog. A larger character size on the terminal screen will be more pleasing to the user but users are generally satisfied with the current 7x9 dot matrix character size. Yet, substantial improvements can be made in the design of online catalog terminals. Special function keys could be precisely labeled, e.g., Author Search, Title Search, Subject Search, etc., and perhaps the function keys could be color coordinated.

The size of the computer, i.e., mainframe or minicomputer, will clearly affect the features made available to the user of the online catalog. Only Mankato State University, with its mainframe computer, is able to provide keyword or term searching, explicit Boolean searching and sorting of the search results for each display. However, mainframe computers imply higher one-time and continuing costs for system acquisitions and maintenance. The larger systems may also require a larger support staff. However, it should not be implied that a mainframe computer is necessary to provide keyword or Boolean searching as this will vary depending on the size of the database, the number of online catalog terminals, and the likely volume of transactions.

Regardless of the size of computer system and its characteristics, two crucial issues pertaining to the computer catalog are system reliability and system response time. All of the systems experienced little or no downtime during the data collection period. More than one-fourth of the users indicated a problem with computer system response times.

The issues surrounding the database are complex and involve a number of trade offs. Should the database contain full MARC records? A full MARC record for all or some of the MARC formats, e.g., monographs serials, maps, etc.? How many indexes should provide access to the database? Should Boolean search capabilities be provided at all, or should they be explicitly or implicitly provided? Should there be term or keyword access to author, title, subject headings, added entries, notes or series data fields? Should a user be able to limit or restrict search results by date of publication, language, format of material, location, etc.? All of these issues and more must be faced by libraries considering an online catalog and by system designers.

The user of the online catalog would like the database expanded to include additional kinds of materials. Almost 4 out of 10 users indicated that they would like access to journal titles and about one-fourth of the users desired access to films, newspapers, government publications and phonograph records or tapes.

The System Interface

The need for standards and consistency in the area of the display of information and use of codes or abbreviations on terminal screens is vital. For example, should bibliographic data elements be labeled? Where should the call number be located? Should the call number be a multi-line display similar to what is found on the spine of the item? Should system messages and options be presented at the bottom of the CRT screen? Should the previous command, used to generate the current display be included on the current display?

Those involved in the standards setting process must rememeber that much of what worked with the 3x5 card technology will not work with CRT technology. As the number of computer catalogs proliferate and the number of separate computer catalogs multiply, this area becomes increasingly important. The time for action is now. Fortunately the work underway by an ANSI Z39 committee is beginning to address this area. The display of bibliographic information on a CRT terminal screen is rarely undertaken from the perspective of the online catalog user. What data elements are needed and in what order do most patrons retrieve information from a bibliographic display? What do a majority of patrons call each specific data element? The current variations for displaying data on a CRT terminal screen are vast indeed.

Users of computer catalogs need improved user cordial ways of retaining control and managing the information that they retrieve. Improvements are needed with the interface itself; standards are needed for a consistent and meaningful command language; and users must be trained in these new capabilities.

Given the amount of subject searching that is occurring with computer catalogs and the problems experienced by users with subject searching, this is an area that commands serious attention at two levels. First, what are the short-term solutions that might be implemented by designers of the computer catalogs to improve subject searching? Possibilities include systems that systematically "capture" terms entered by users to build a list of aliases (SEE References) to aid the user in moving from words entered by the user to Library of Congress Subject Headings terms. In addition, the Library of Congress might begin to assign more subject headings to each MARC record to improve the likehood of a user finding valid subject headings. Second, what long-term steps might be taken by the library community to enhance subject searching at the public access computer catalogs?

The ability to view and browse an authority control file is perhaps crucial to the success of the online catalog. The authority control file, given sufficient SEE and SEE ALSO cross references, can link the terms used by users to the pre-coordinate subject headings usually employed by libraries.

Perhaps the only realistic solution to the shortcomings of the Library of Congress Subject Headings (LCSH) is to provide users of the computer catalog with term or keyword searching. Such a technique substantially increases the number of access points and thus the number of records retrieved by a system. The user of keyword searching need not be restricted to subject headings but can also be used for author, title, notes, series, etc. searches. Additional techniques, such as the "keyword approximation search" used at the Washington University School of Medicine in St. Louis, Missouri, can be used to improve the likelihood of a user's being successful at the online catalog. Owing to the improved searches likely to result from an augmented MARC record, i.e., MARC plus the addition of the table of contents and/or index terms, serious attention should be paid to the creation, distribution and use of augmented records for use in online catalogs.

Online Catalog Use and Satisfaction

Users at the online catalog do perform a considerable amount of subject searching. This is particularly true at Mission/West Valley Colleges when the user is provided with a display of valid subject headings as a result of the subject search entered by the user. Subject searching is also high at Mankato State where the user has the opportunity to use term or keyword searching. Almost half of all searches entered by users at Mankato State are for term or keyword searching. And there are more than twice as many term searches, which retrieve the entered term(s) from the subject headings, title and author fields, than subject heading searches at Mankato State. It would thus seem that providing term or keyword searching and displaying (and browsing) valid subject headings should be mandatory requirements for any online catalog. Selecting a particularly relevent document using a keyword search and then viewing all the records that have the same subject heading(s), through the use of an "Expand" command, would be a powerful tool for online catalog users.

Users of the online catalog seem to enjoy a high success rate in using the online catalog and are very positive in rating the online catalog for a specific search and in their general attitudes toward the computer catalog. Users of the online catalog seldom go back to other formats of the catalog. Use of the catalog and use of the library's collection does seem to increase after an online catalog is installed.

SECTION I

THE CLR PUBLIC ACCESS CATALOG STUDY: AN OVERVIEW

Automation, especially the automation of routine recordkeeping or housekeeping activities, is having a significant impact upon the delivery of library services. Examples of routine housekeeping activities that have been automated include the preparation of library catalog cards through an online bibliographic utility such as OCLC, RLIN, or WLN, the production of computer output microform (COM) catalogs, and the installation of various commercially available automated circulation systems. However, the information retrieval capabilities of the computer have not, until recently, been directly available for use by the library patron (Matthews, 1982A).

Computer terminals, historically under the direct control and used solely by library staff members, are now being moved to the public catalog areas, placed in the stacks of libraries, and located in other high use locations within the library. A variety of online public access catalogs in different library settings is being made directly available to library patrons. These online catalog systems may have been developed locally by library staff, installed by a commercial circulation system vendor, or may be linked to a bibliographic utility.

During the summer of 1980, the Council on Library Resources (CLR) funded a joint study by the Research Libraries Group (RLG) and Online Computer Library Center (OCLC) to assess the issues and problems in designing, developing, and operating online public access catalogs. After a survey of existing online catalogs was conducted and an issues paper prepared, a working session, known among the twenty-five participants as the Dartmouth Conference, identified four priority areas for systematic study and cooperative efforts. These priority areas are:

1. Analyzing user requirements and behavior
2. Monitoring existing public access systems
3. Developing cost management methods
4. Developing distributing computing and system linkages (Ferguson and Kaske, 1980).

The Council on Library Resources Bibliographic Service Development Program (BSDP) was organized to coordinate the research projects sponsored by CLR in the area of bibliographic services (Jones and Gwinn, 1979). Following the Dartmouth Conference CLR subsequently awarded online catalog research grants or contracts to: Online Computer Library Center (OCLC); The Research Libraries Group (RLG); J. Matthews & Associates, Inc.; University of California, Division of Library Automation; and the Library of Congress. These concurrent research project awards were based on the understanding that each of the participants would cooperatively develop the data collection instruments and data gathering procedures necessary for a detailed study of online public access catalogs. The significant effect of this coordination was that standard data collection instruments and data collection procedures would be used by all of the participants in this CLR supported research project. Thus, one of the major limitations of the prior card catalog use studies, which is their institutional bias or study-specific findings, was overcome through the use of a "standard" data collection instruments. As the direct result of participation by a large number of organizations in the CLR project, these data collection instruments were thoroughly pre-tested in a variety of library environments.

Rather than a broad-based study of all aspects of online public access catalogs, the underlying theme or focus of this cooperative research project was the interface between the human user of the online catalog terminal and the computer system which supports and responds to the user's request for information. Thus the data collection methodology focused upon two groups of individuals. The first was the users of the online public access catalog. In particular, users were asked about the problems they experience with the human-computer interface and encouraged to identify their preferences for improving the online catalog. The second group of individuals studied were users of the library who are non-users of the online public access catalog. The non-users were asked the reasons for their non-use of the online catalog and encouraged to share their perceptions of an online catalog.

Both users and non-users were asked to complete self-administered machine-scanable questionnaires. The specific goals of the questionnaire survey are: 1) to produce data and analysis that will enable designers of public online catalogs to improve online catalog system interface features. The system interface includes commands, displays, indexes, and similar software and hardware related features; 2) to gather data and prepare an analysis that will enable libraries to improve the implementation and support services for online public access catalogs; and 3) to collect additional data that will enable libraries to extend online public access catalog services to potential users.

Since the focus of the study was on the human-computer interface, the data collected was, of necessity, primarily from users of the online catalog. User data was collected in the participating libraries in randomly-scheduled four-hour time blocks, i.e., morning, afternoon and evenings. During April and May 1982, four four-hour time blocks were scheduled to collect user data each week. During each week, two four-hour time blocks were scheduled to collect non-user data. The time blocks were scheduled in such a way that terminals reflecting the greatest amount of use received proportionally more data collection activity. While a random sample from online catalog terminals located in each library was considered and used during the questionnaire pretest conducted in October-December, 1981, it was decided to concentrate data gathering at the more frequently used terminals during the final data collection period. However, all terminal locations in each participating library were included in the data gathered.

The User Questionnaire asked users to complete a self-administered questionnaire immediately after using the terminal; non-users were asked to complete the self-administered questionnaire from one location - typically when they entered the library. User questionnaires asked about the purpose of the catalog use just completed, about problems experienced with various features of the online catalog and library services associated with it, and about suggestions for improving both the online public access catalog and associated library services. Non-users were asked their reasons for non-use and their perceptions of an online catalog. Demographic information was collected from both users and non-users. Additional information about the CLR Public Online Catalog Study and copies of the actual questionnaires appear in the article by Ferguson, et al (1982).

SECTION II

PARTICIPATING LIBRARIES

Six computer systems and seven libraries were participants in the J. Matthews and Associates, Inc. (JMA) portion of the CLR Online Public Access Study. These seven library participants included: Claremont Colleges Library which uses the Claremont Total Library System (developed by Claremont staff and now marketed by OCLC); the Evanston Public Library which uses the CL Systems, Inc. LIBS 100 touch screen terminal public access catalog; the Minnesota State University online union catalog, which was developed at Mankato State University; Pikes Peak Regional Library, which uses their own in-house developed computer system called Maggie's Place; Stephen F. Austin University which uses a DataPhase Systems, Inc. turnkey circulation system; and the West Valley Joint Community College District whose two community college campuses - Mission College and West Valley College share a Universal Library Systems (ULISYS) turnkey circulation system. For the purpose of this analysis, respondents from Mission and West Valley Colleges have been grouped together.

Rather than referring to each of the seven participating libraries in alphabetic order, the four academic libraries and the two public libraries have been grouped together to allow the reader the opportunity to more easily compare and contrast the results of the study by type of library.

This section presents a brief review of each of the libraries and its organizational context, a brief history of the development of each online catalog, and the location and number of online public access catalog terminals in each library.

More detailed information about each of the online catalogs participating in this study may be found in Hildreth (1982) and Matthews (1982 B).

Claremont Colleges Libraries

The Claremont Colleges Libraries serve about 12,000 registered borrowers from the independent Claremont Colleges, located in Southern California.

The Claremont Online Public Access Catalog is a part of a automated library system called the Total Library System which was developed by the Claremont Colleges library staff and is now being marketed in a modified form by OCLC. The Total Library System runs on a Hewlett Packard 3000 series II minicomputer. The application programming languages are COBOL and SPL. Currently only the Science libraries at Claremont have online public access catalog terminals. There are a total of 8 terminals, 3 of which are in the Joint Science Library and 1 each in five branch Science libraries.

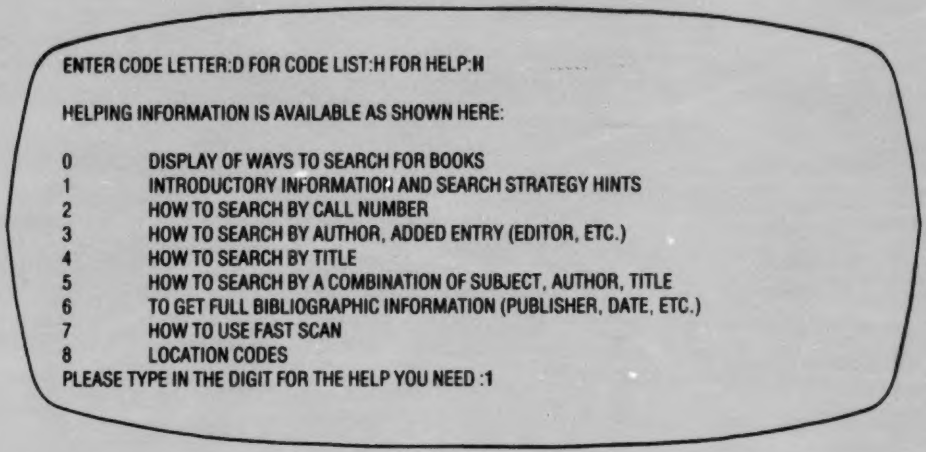
The Total Library System allows the patron to gain access to both the online catalog and circulation system. At present, the computer catalog does not access the acquisitions database. Author, title, series, subject heading, and call number searches are possible. EXHIBIT 1 provides sample screens of the Claremont system. Currently there are about 69,000 records reflecting Science library holdings in the Total Library System database.

EXHIBIT 2 provides a map of the Joint Science Libraries indicating the location of the public access terminals.

Minnesota State University Online Union Catalog

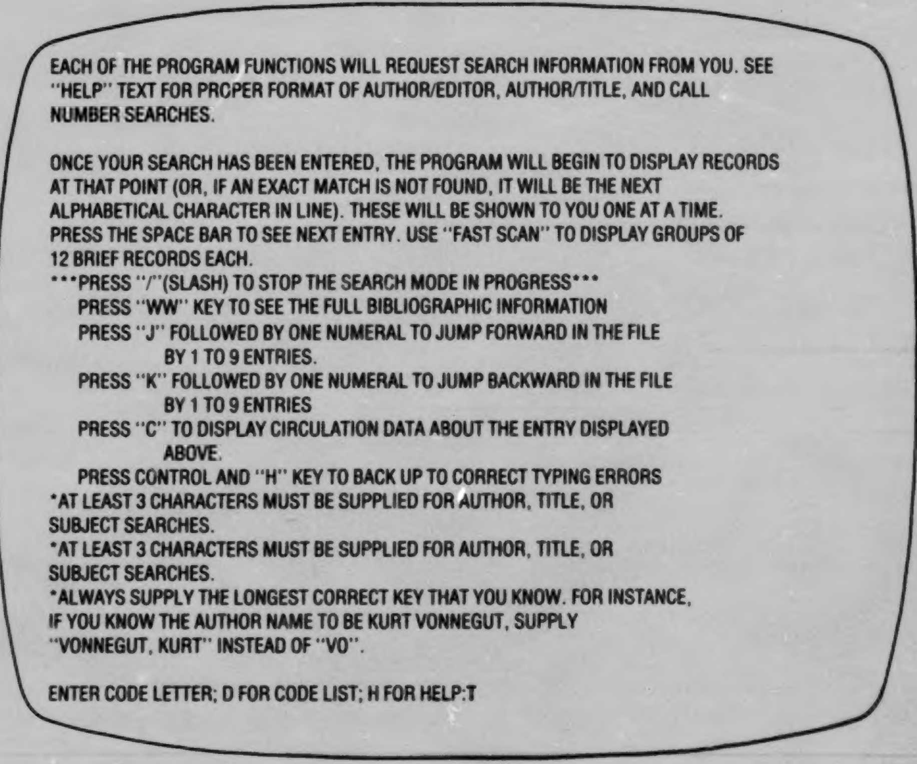
The Mankato State University Library is located about 60 miles south of Minneapolis, Minnesota. Mankato State University has about 15,000 registered library patrons and some 311,000 items in its total collection, housed in a four-floor library facility. Of these, approximately 232,000 titles including almost all of the monographs have been converted to machine-readable form and thus are available in the online catalog.

The Minnesota State Universities Systems Project for Automation of Library Systems (MSUS/PALS) began in 1978 with plans to develop a Minnesota State University System-wide Online Union Catalog. The computer catalog was developed at Mankato State University by library staff and in 1980 the online catalog capabilities were



```
ENTER CODE LETTER:D FOR CODE LIST:H FOR HELP:H

HELPING INFORMATION IS AVAILABLE AS SHOWN HERE:

0          DISPLAY OF WAYS TO SEARCH FOR BOOKS
1          INTRODUCTORY INFORMATION AND SEARCH STRATEGY HINTS
2          HOW TO SEARCH BY CALL NUMBER
3          HOW TO SEARCH BY AUTHOR, ADDED ENTRY (EDITOR, ETC.)
4          HOW TO SEARCH BY TITLE
5          HOW TO SEARCH BY A COMBINATION OF SUBJECT, AUTHOR, TITLE
6          TO GET FULL BIBLIOGRAPHIC INFORMATION (PUBLISHER, DATE, ETC.)
7          HOW TO USE FAST SCAN
8          LOCATION CODES
PLEASE TYPE IN THE DIGIT FOR THE HELP YOU NEED :1
```

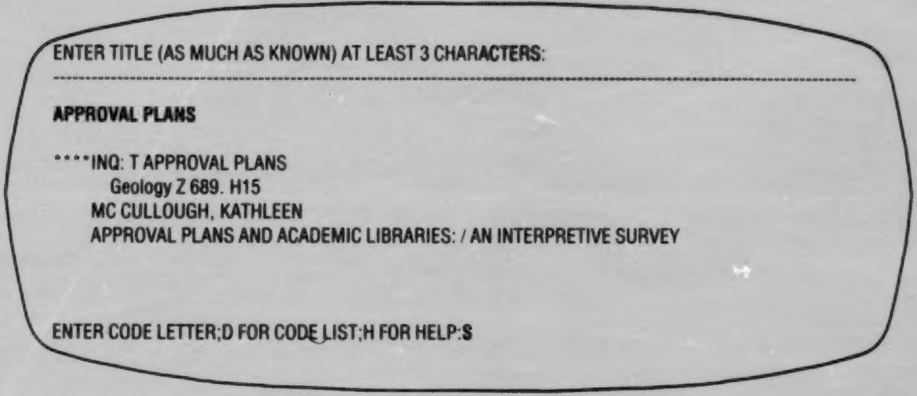
Initial screen and user enters "HELP" and then selects Introductory information.



```
EACH OF THE PROGRAM FUNCTIONS WILL REQUEST SEARCH INFORMATION FROM YOU. SEE
"HELP" TEXT FOR PROPER FORMAT OF AUTHOR/EDITOR, AUTHOR/TITLE, AND CALL
NUMBER SEARCHES.

ONCE YOUR SEARCH HAS BEEN ENTERED, THE PROGRAM WILL BEGIN TO DISPLAY RECORDS
AT THAT POINT (OR, IF AN EXACT MATCH IS NOT FOUND, IT WILL BE THE NEXT
ALPHABETICAL CHARACTER IN LINE). THESE WILL BE SHOWN TO YOU ONE AT A TIME.
PRESS THE SPACE BAR TO SEE NEXT ENTRY. USE "FAST SCAN" TO DISPLAY GROUPS OF
12 BRIEF RECORDS EACH.
***PRESS "/"(SLASH) TO STOP THE SEARCH MODE IN PROGRESS***
   PRESS "WW" KEY TO SEE THE FULL BIBLIOGRAPHIC INFORMATION
   PRESS "J" FOLLOWED BY ONE NUMERAL TO JUMP FORWARD IN THE FILE
         BY 1 TO 9 ENTRIES.
   PRESS "K" FOLLOWED BY ONE NUMERAL TO JUMP BACKWARD IN THE FILE
         BY 1 TO 9 ENTRIES
   PRESS "C" TO DISPLAY CIRCULATION DATA ABOUT THE ENTRY DISPLAYED
         ABOVE.
   PRESS CONTROL AND "H" KEY TO BACK UP TO CORRECT TYPING ERRORS
*AT LEAST 3 CHARACTERS MUST BE SUPPLIED FOR AUTHOR, TITLE, OR
SUBJECT SEARCHES.
*AT LEAST 3 CHARACTERS MUST BE SUPPLIED FOR AUTHOR, TITLE, OR
SUBJECT SEARCHES.
*ALWAYS SUPPLY THE LONGEST CORRECT KEY THAT YOU KNOW. FOR INSTANCE,
IF YOU KNOW THE AUTHOR NAME TO BE KURT VONNEGUT, SUPPLY
"VONNEGUT, KURT" INSTEAD OF "VO".

ENTER CODE LETTER; D FOR CODE LIST; H FOR HELP:T
```

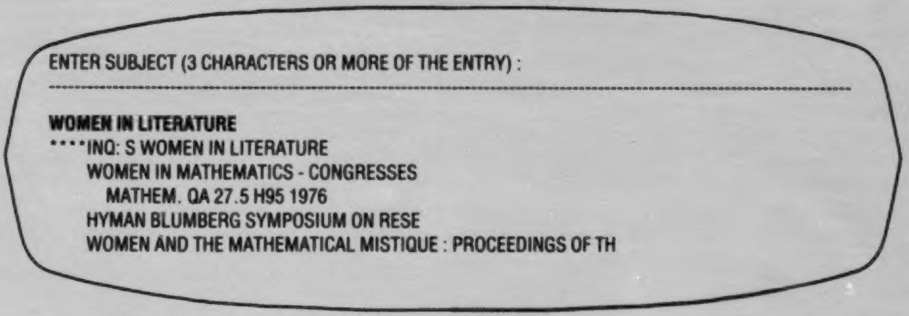
Introductory information display and user wants to conduct a title search.

EXHIBIT 1: Sample screens for the
Claremont Total Library System



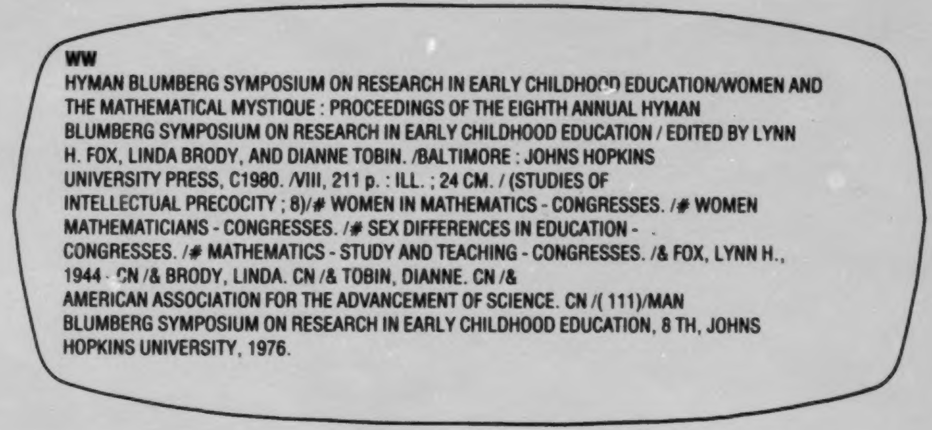
```
ENTER TITLE (AS MUCH AS KNOWN) AT LEAST 3 CHARACTERS:
--------------------------------------------------------------------------------

APPROVAL PLANS

****INQ: T APPROVAL PLANS
      Geology Z 689. H15
    MC CULLOUGH, KATHLEEN
    APPROVAL PLANS AND ACADEMIC LIBRARIES: / AN INTERPRETIVE SURVEY



ENTER CODE LETTER;D FOR CODE LIST;H FOR HELP:S
```

User enters "APPROVAL PLANS" and retrieves one record. User then starts a subject search.



```
ENTER SUBJECT (3 CHARACTERS OR MORE OF THE ENTRY) :
--------------------------------------------------------------------------------

WOMEN IN LITERATURE
****INQ: S WOMEN IN LITERATURE
    WOMEN IN MATHEMATICS - CONGRESSES
      MATHEM. QA 27.5 H95 1976
    HYMAN BLUMBERG SYMPOSIUM ON RESE
    WOMEN AND THE MATHEMATICAL MISTIQUE : PROCEEDINGS OF TH
```

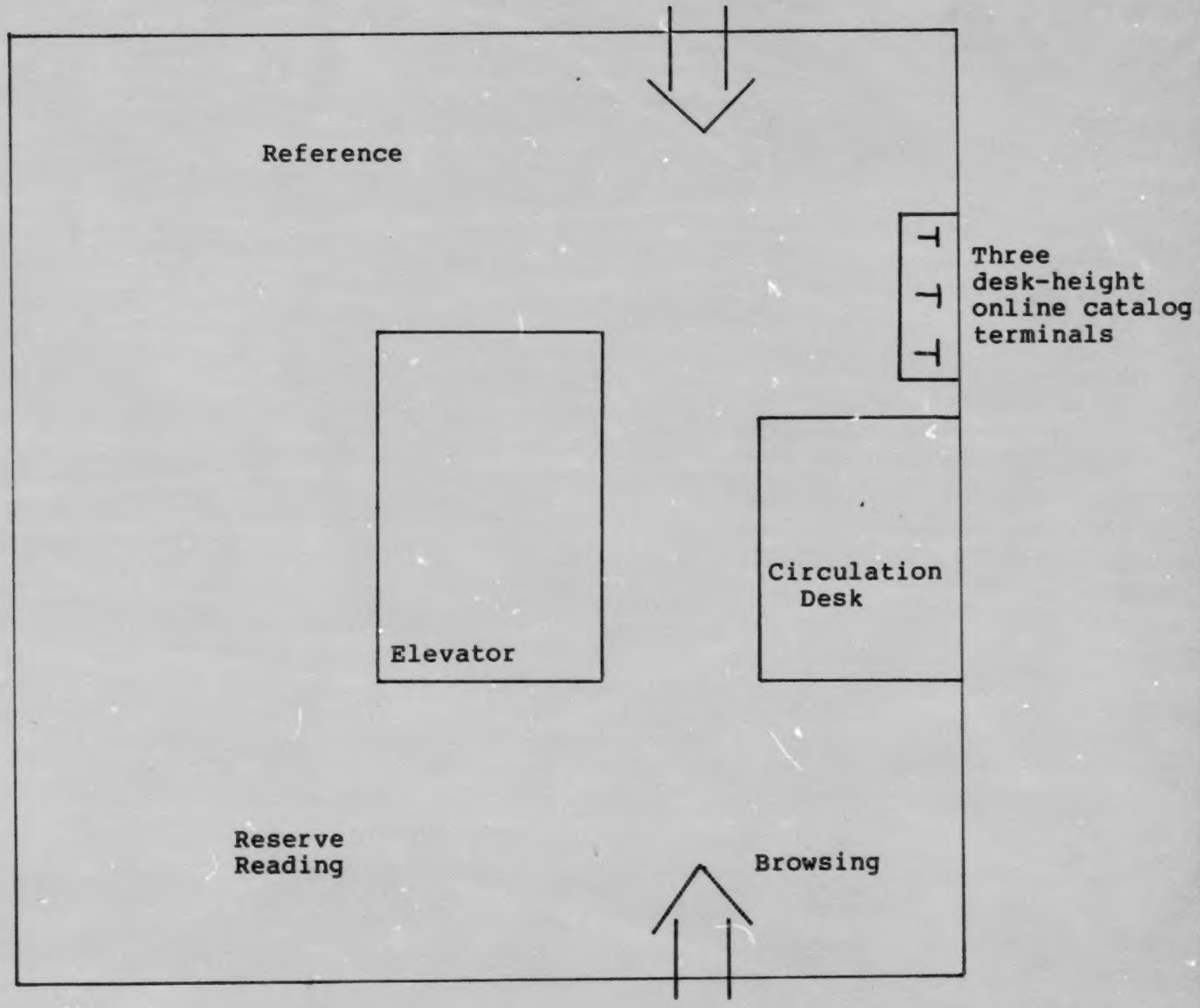
User enters "WOMEN IN LITERATURE."



```
WW
HYMAN BLUMBERG SYMPOSIUM ON RESEARCH IN EARLY CHILDHOOD EDUCATION/WOMEN AND
THE MATHEMATICAL MYSTIQUE : PROCEEDINGS OF THE EIGHTH ANNUAL HYMAN
BLUMBERG SYMPOSIUM ON RESEARCH IN EARLY CHILDHOOD EDUCATION / EDITED BY LYNN
H. FOX, LINDA BRODY, AND DIANNE TOBIN. /BALTIMORE : JOHNS HOPKINS
UNIVERSITY PRESS, C1980. /VIII, 211 p. : ILL. ; 24 CM. / (STUDIES OF
INTELLECTUAL PRECOCITY ; 8)/# WOMEN IN MATHEMATICS - CONGRESSES. /# WOMEN
MATHEMATICIANS - CONGRESSES. /# SEX DIFFERENCES IN EDUCATION -
CONGRESSES. /# MATHEMATICS - STUDY AND TEACHING - CONGRESSES. /& FOX, LYNN H.,
1944 - CN /& BRODY, LINDA. CN /& TOBIN, DIANNE. CN /&
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. CN /( 111)/MAN
BLUMBERG SYMPOSIUM ON RESEARCH IN EARLY CHILDHOOD EDUCATION, 8 TH, JOHNS
HOPKINS UNIVERSITY, 1976.
```

User requests a full record display.

EXHIBIT 1 (continued)


Reference
Three desk-height online catalog terminals
Elevator
Circulation Desk
Reserve Reading
Browsing

First of Four Floors

EXHIBIT 2: Online catalog terminal locations in the Claremont Colleges Joint Sciences Library

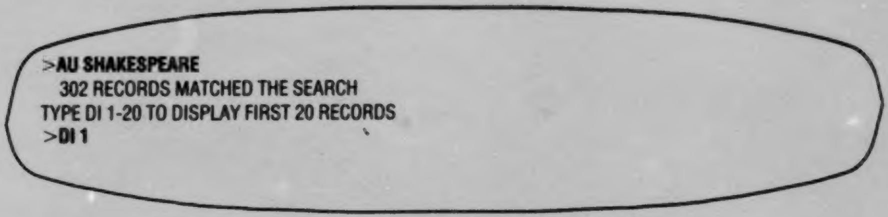
demonstrated in a prototype system. By September 1980 a full database, composed of OCLC records from participating member libraries, was loaded into the computer system and available for use by library patrons. In the Spring of 1982 a total of 93 terminals in six state university libraries were operational. In the spring of 1982, the Minnesota State University System Online Union Catalog had 22 terminals available to library patrons at Mankato State, 21 terminals available at St. Cloud State University Library, 12 at Moorhead State, 10 at Bemidji State, 8 at Southwest State University, 10 at North Dakota State University, and 10 at Concordia College Library, but only those terminals and users located at Mankato State were studied.

The online catalog software is run on a UNIVAC 1100 model 80A, a mainframe computer shared with other academic applications (e.g., programs submitted by students and faculty). Currently the bibliographic database contains approximately 640,000 unique titles reflecting 1,226,000 "location holding symbols." The 232,000 records of Mankato State are included in this larger database. The system is available 105 hours per week and the online catalog backup is a microfiche catalog produced once a year. The online catalog can be searched using author, title, combination of author and title, subjects headings, and descriptive terms or keywords from either the title, corporate author, or subject headings. A mnemonic command language is used for searching by the library patron. Search results can be modified or limited by publication date, by language, by type of material, and by library location. The system also allows the library patron to broaden or narrow a search using explicit or implied boolean operators. EXHIBIT 3 illustrates the search and display capabilities of the Minnesota State University system.

The locations of the terminals at the Mankato State University Library are shown in EXHIBIT 4. EXHIBIT 5 shows the distribution of transactions by each terminal location within the library. Almost half of all transactions (48.6%) occur in the main catalog area at the terminals provided for patron use. Another one-fourth of the transactions were from the patron terminals provided on the second floor - the area where the stacks are located. The terminals which are shared by patrons and staff experience considerably fewer transactions. It is interesting to note that in February 1982 a total of 255,365 transactions were entered by users of the online catalog at Mankato State - the highest volume of transactions to date (a total of 664,000 transactions occurred for all of the terminals linked to the Minnesota State University Online Union Catalog).

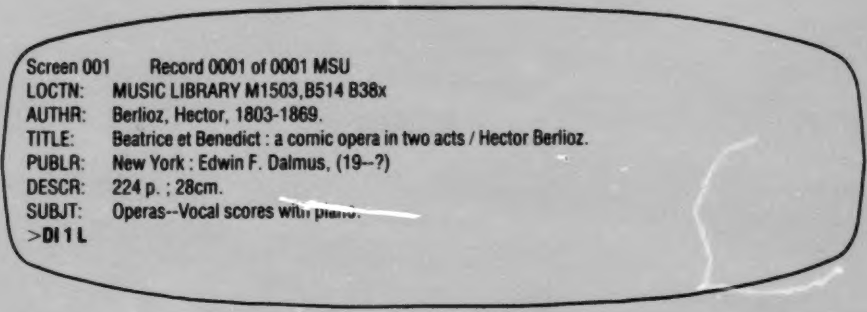
Mankato library staff members have produced a one page handout sheet which provides basic directions to the library catalog access system as well as a multiple page booklet explaining how to use the online catalog. A summary command guide is affixed to the front of the terminal next to the CRT screen.

User enters an author search for "SHAKESPEARE" and asks for display of first record.



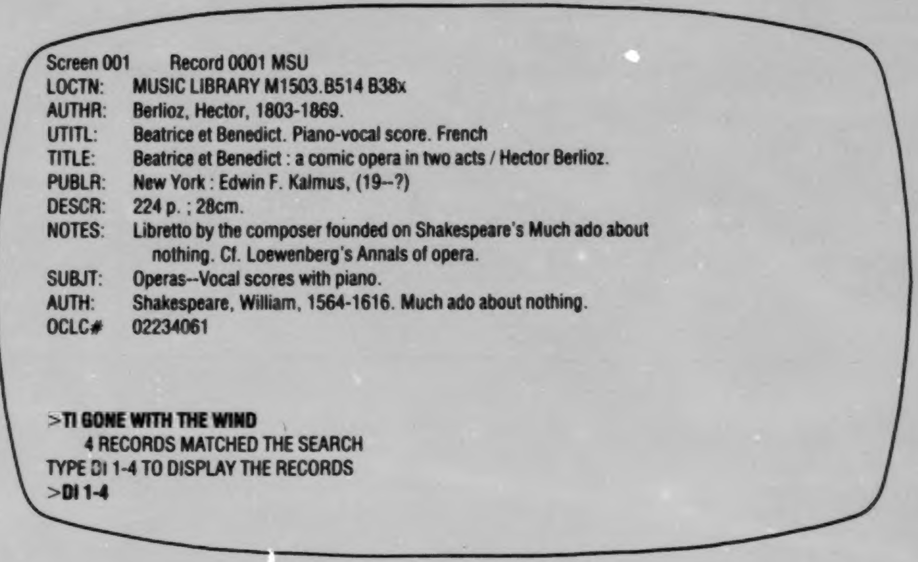
```
>AU SHAKESPEARE
  302 RECORDS MATCHED THE SEARCH
TYPE DI 1-20 TO DISPLAY FIRST 20 RECORDS
>DI 1
```

Short record display, user asks for display of first record in long form.



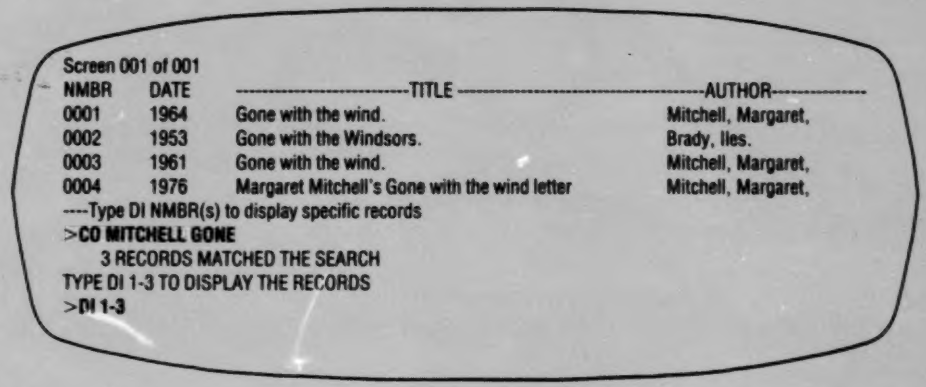
```
Screen 001      Record 0001 of 0001 MSU
LOCTN:    MUSIC LIBRARY M1503,B514 B38x
AUTHR:    Berlioz, Hector, 1803-1869.
TITLE:    Beatrice et Benedict : a comic opera in two acts / Hector Berlioz.
PUBLR:    New York : Edwin F. Dalmus, (19--?)
DESCR:    224 p. ; 28cm.
SUBJT:    Operas--Vocal scores with piano.
>DI 1 L
```

Full record display, user enters a new title search and asks for display of first four records.



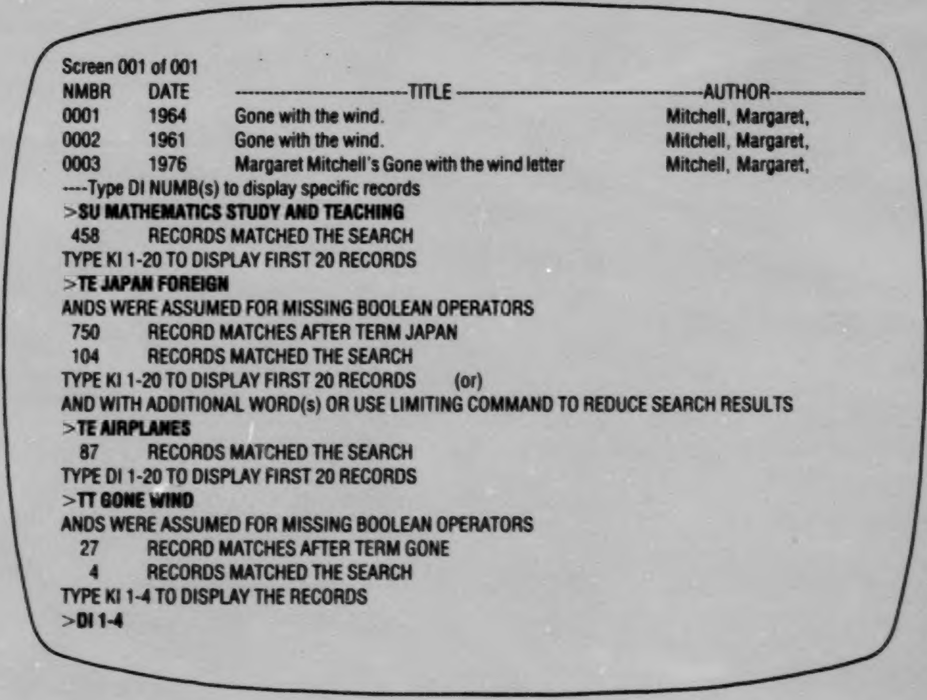
```
Screen 001      Record 0001 MSU
LOCTN:    MUSIC LIBRARY M1503.B514 B38x
AUTHR:    Berlioz, Hector, 1803-1869.
UTITL:    Beatrice et Benedict. Piano-vocal score. French
TITLE:    Beatrice et Benedict : a comic opera in two acts / Hector Berlioz.
PUBLR:    New York : Edwin F. Kalmus, (19--?)
DESCR:    224 p. ; 28cm.
NOTES:    Libretto by the composer founded on Shakespeare's Much ado about
            nothing. Cf. Loewenberg's Annals of opera.
SUBJT:    Operas--Vocal scores with piano.
AUTH:     Shakespeare, William, 1564-1616. Much ado about nothing.
OCLC#     02234061


>TI GONE WITH THE WIND
  4 RECORDS MATCHED THE SEARCH
TYPE DI 1-4 TO DISPLAY THE RECORDS
>DI 1-4
```

EXHIBIT 3: Sample screens for the Minnesota State University System



```
Screen 001 of 001
NMBR    DATE    ---------------------------TITLE ------------------------------------AUTHOR--------------
0001    1964    Gone with the wind.                                    Mitchell, Margaret,
0002    1953    Gone with the Windsors.                                Brady, Iles.
0003    1961    Gone with the wind.                                    Mitchell, Margaret,
0004    1976    Margaret Mitchell's Gone with the wind letter          Mitchell, Margaret,
----Type DI NMBR(s) to display specific records
>CO MITCHELL GONE
     3 RECORDS MATCHED THE SEARCH
TYPE DI 1-3 TO DISPLAY THE RECORDS
>DI 1-3
```

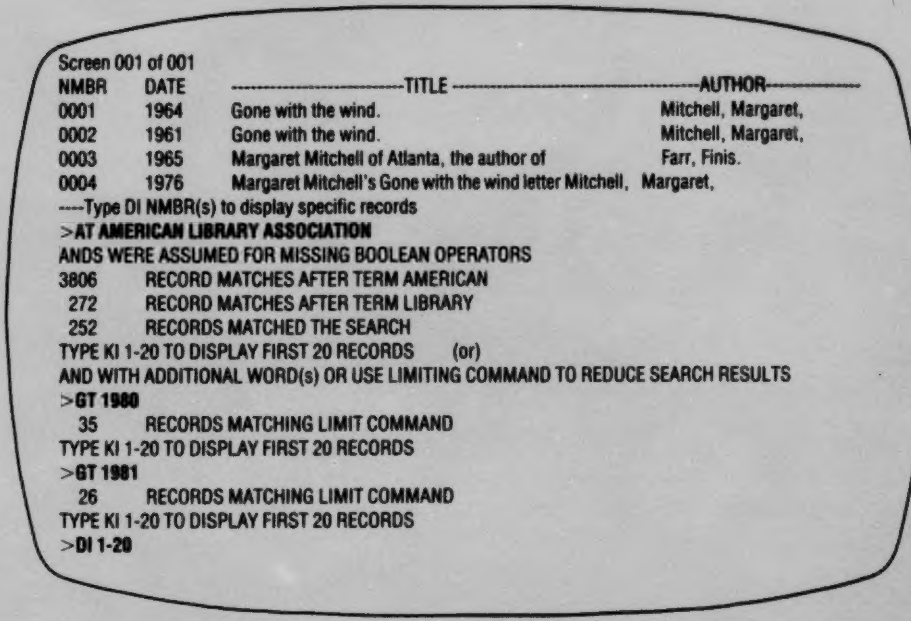
Brief record display, user requests the system to combine the search terms "MITCHELL" and "GONE" and display the results.



```
Screen 001 of 001
NMBR    DATE    ---------------------------TITLE ------------------------------------AUTHOR--------------
0001    1964    Gone with the wind.                                    Mitchell, Margaret,
0002    1961    Gone with the wind.                                    Mitchell, Margaret,
0003    1976    Margaret Mitchell's Gone with the wind letter          Mitchell, Margaret,
----Type DI NUMB(s) to display specific records
>SU MATHEMATICS STUDY AND TEACHING
 458        RECORDS MATCHED THE SEARCH
TYPE KI 1-20 TO DISPLAY FIRST 20 RECORDS
>TE JAPAN FOREIGN
ANDS WERE ASSUMED FOR MISSING BOOLEAN OPERATORS
  750       RECORD MATCHES AFTER TERM JAPAN
  104       RECORDS MATCHED THE SEARCH
TYPE KI 1-20 TO DISPLAY FIRST 20 RECORDS      (or)
AND WITH ADDITIONAL WORD(s) OR USE LIMITING COMMAND TO REDUCE SEARCH RESULTS
>TE AIRPLANES
  87        RECORDS MATCHED THE SEARCH
TYPE DI 1-20 TO DISPLAY FIRST 20 RECORDS
>TT GONE WIND
ANDS WERE ASSUMED FOR MISSING BOOLEAN OPERATORS
  27        RECORD MATCHES AFTER TERM GONE
   4        RECORDS MATCHED THE SEARCH
TYPE KI 1-4 TO DISPLAY THE RECORDS
>DI 1-4
```

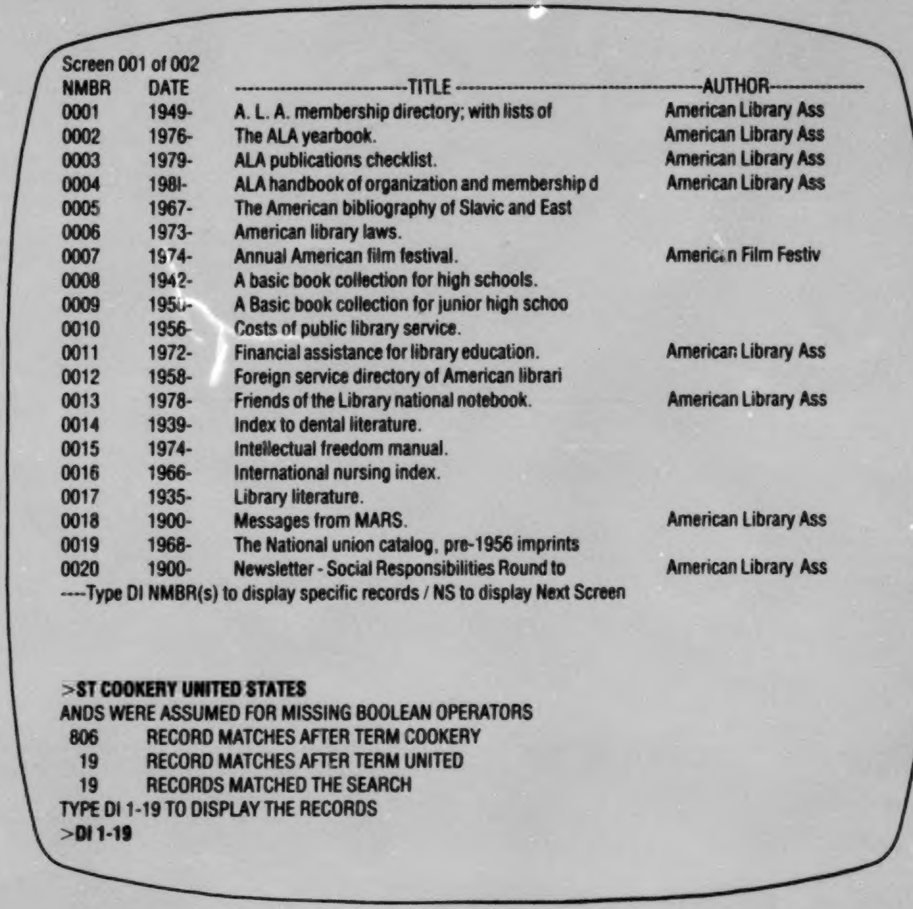
User conducts a subject search, a term search for "JAPAN FOREIGN;" "AIRPLANES," a title term search for "GONE WIND" and the display of the first four records.

EXHIBIT 3 (continued)



```
Screen 001 of 001
NMBR    DATE    --------------------------TITLE ----------------------------------AUTHOR--------------
0001    1964    Gone with the wind.                                 Mitchell, Margaret,
0002    1961    Gone with the wind.                                 Mitchell, Margaret,
0003    1965    Margaret Mitchell of Atlanta, the author of         Farr, Finis.
0004    1976    Margaret Mitchell's Gone with the wind letter Mitchell,  Margaret,
----Type DI NMBR(s) to display specific records
>AT AMERICAN LIBRARY ASSOCIATION
ANDS WERE ASSUMED FOR MISSING BOOLEAN OPERATORS
3806    RECORD MATCHES AFTER TERM AMERICAN
 272    RECORD MATCHES AFTER TERM LIBRARY
 252    RECORDS MATCHED THE SEARCH
TYPE KI 1-20 TO DISPLAY FIRST 20 RECORDS      (or)
AND WITH ADDITIONAL WORD(s) OR USE LIMITING COMMAND TO REDUCE SEARCH RESULTS
>GT 1980
  35    RECORDS MATCHING LIMIT COMMAND
TYPE KI 1-20 TO DISPLAY FIRST 20 RECORDS
>GT 1981
  26    RECORDS MATCHING LIMIT COMMAND
TYPE KI 1-20 TO DISPLAY FIRST 20 RECORDS
>DI 1-20
```

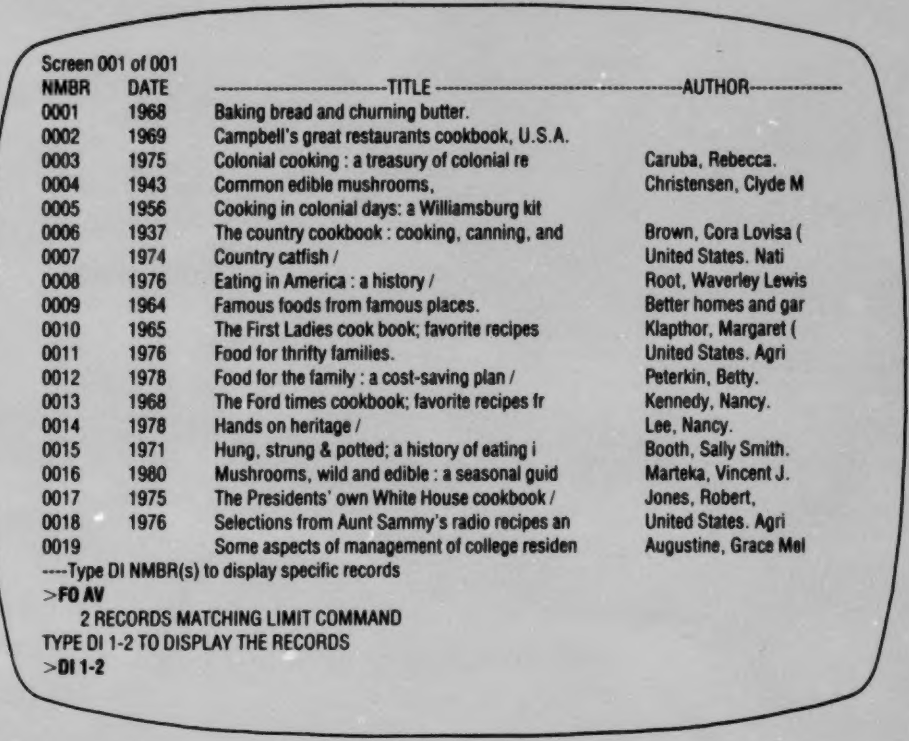
Brief record display and user now conducts a new author term search which is then reduced by date of publication.



```
Screen 001 of 002
NMBR    DATE    --------------------------TITLE ----------------------------------AUTHOR--------------
0001    1949-   A. L. A. membership directory; with lists of        American Library Ass
0002    1976-   The ALA yearbook.                                   American Library Ass
0003    1979-   ALA publications checklist.                         American Library Ass
0004    1981-   ALA handbook of organization and membership d       American Library Ass
0005    1967-   The American bibliography of Slavic and East
0006    1973-   American library laws.
0007    1974-   Annual American film festival.                      American Film Festiv
0008    1942-   A basic book collection for high schools.
0009    1950-   A Basic book collection for junior high schoo
0010    1956-   Costs of public library service.
0011    1972-   Financial assistance for library education.         American Library Ass
0012    1958-   Foreign service directory of American librari
0013    1978-   Friends of the Library national notebook.           American Library Ass
0014    1939-   Index to dental literature.
0015    1974-   Intellectual freedom manual.
0016    1966-   International nursing index.
0017    1935-   Library literature.
0018    1900-   Messages from MARS.                                 American Library Ass
0019    1968-   The National union catalog, pre-1956 imprints
0020    1900-   Newsletter - Social Responsibilities Round to       American Library Ass
----Type DI NMBR(s) to display specific records / NS to display Next Screen


>ST COOKERY UNITED STATES
ANDS WERE ASSUMED FOR MISSING BOOLEAN OPERATORS
 806    RECORD MATCHES AFTER TERM COOKERY
  19    RECORD MATCHES AFTER TERM UNITED
  19    RECORDS MATCHED THE SEARCH
TYPE DI 1-19 TO DISPLAY THE RECORDS
>DI 1-19
```

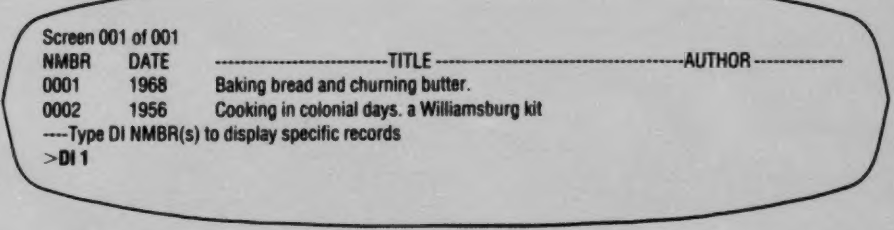
Brief record display for 20 records. User then conducts a new subject term search.

EXHIBIT 3 (continued)



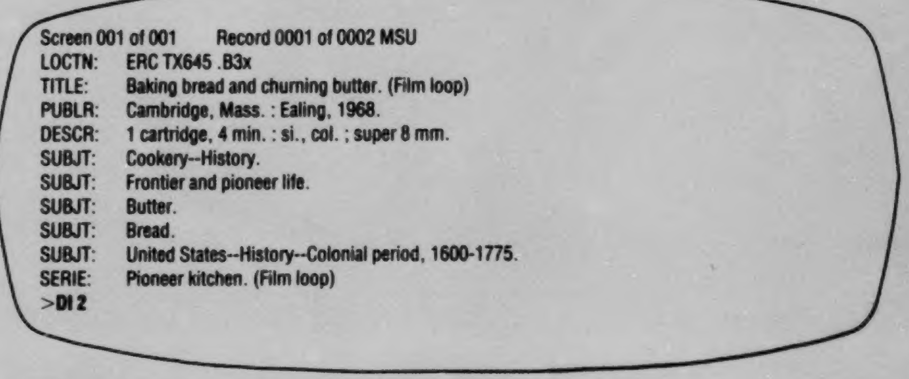
Brief record display, and user restricts search results by material format.

```
Screen 001 of 001
NMBR   DATE   --------------------------TITLE ------------------------------------AUTHOR--------------
0001   1968   Baking bread and churning butter.
0002   1969   Campbell's great restaurants cookbook, U.S.A.
0003   1975   Colonial cooking : a treasury of colonial re          Caruba, Rebecca.
0004   1943   Common edible mushrooms,                              Christensen, Clyde M
0005   1956   Cooking in colonial days: a Williamsburg kit
0006   1937   The country cookbook : cooking, canning, and          Brown, Cora Lovisa (
0007   1974   Country catfish /                                     United States. Nati
0008   1976   Eating in America : a history /                       Root, Waverley Lewis
0009   1964   Famous foods from famous places.                      Better homes and gar
0010   1965   The First Ladies cook book; favorite recipes          Klapthor, Margaret (
0011   1976   Food for thrifty families.                            United States. Agri
0012   1978   Food for the family : a cost-saving plan /            Peterkin, Betty.
0013   1968   The Ford times cookbook; favorite recipes fr          Kennedy, Nancy.
0014   1978   Hands on heritage /                                   Lee, Nancy.
0015   1971   Hung, strung & potted; a history of eating i          Booth, Sally Smith.
0016   1980   Mushrooms, wild and edible : a seasonal guid          Marteka, Vincent J.
0017   1975   The Presidents' own White House cookbook /            Jones, Robert,
0018   1976   Selections from Aunt Sammy's radio recipes an         United States. Agri
0019          Some aspects of management of college residen         Augustine, Grace Mel
----Type DI NMBR(s) to display specific records
>FO AV
     2 RECORDS MATCHING LIMIT COMMAND
TYPE DI 1-2 TO DISPLAY THE RECORDS
>DI 1-2
```



Brief record display and user's request to display first record.

```
Screen 001 of 001
NMBR   DATE   --------------------------TITLE ------------------------------------AUTHOR --------------
0001   1968   Baking bread and churning butter.
0002   1956   Cooking in colonial days. a Williamsburg kit
----Type DI NMBR(s) to display specific records
>DI 1
```



Display of first record and user's request to see the second.

```
Screen 001 of 001      Record 0001 of 0002 MSU
LOCTN:    ERC TX645 .B3x
TITLE:    Baking bread and churning butter. (Film loop)
PUBLR:    Cambridge, Mass. : Ealing, 1968.
DESCR:    1 cartridge, 4 min. : si., col. ; super 8 mm.
SUBJT:    Cookery--History.
SUBJT:    Frontier and pioneer life.
SUBJT:    Butter.
SUBJT:    Bread.
SUBJT:    United States--History--Colonial period, 1600-1775.
SERIE:    Pioneer kitchen. (Film loop)
>DI 2
```

EXHIBIT 3 (continued)

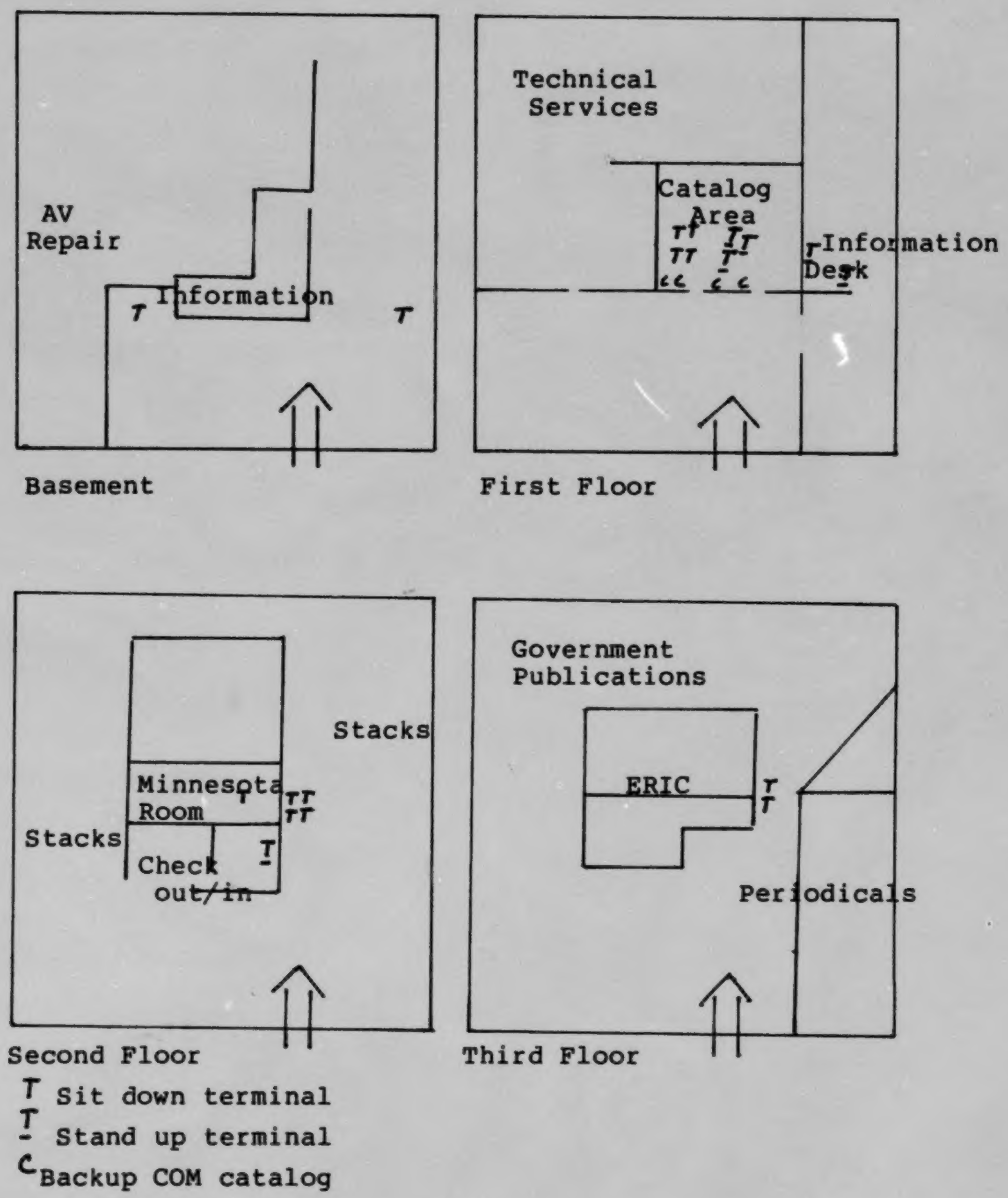

AV
Repair
Information
T
T
Basement
Technical
Services
Catalog
Area
Information
Desk
First Floor
Stacks
Minnesota
Room
Stacks
Check
out/in
Second Floor
Government
Publications
ERIC
Periodicals
Third Floor
T Sit down terminal
T Stand up terminal
C Backup COM catalog

EXHIBIT 4: Online catalog terminal locations in the Memorial Library at Mankato State University

EXHIBIT 5: Volume of Transactions at the Mankato State University Library during April, 1982

Location	Terminal ID #	Stand up Sit down	Number of Transactions	Total % of Transactions
Basement				
	05	Sit Down	6,317	2.6
	06	Sit Down	9,519	4.0
First Floor - Catalog Area				
	26	Sit Down	16,618	6.9
	11	Sit Down	15,369	6.4
	9	Sit Down	16,966	7.1
	13	Sit Down	16,717	7.0
	12	Stand Up	17,723	7.4
	14	Stand Up	16,581	6.9
	10	Stand Up	16,646	6.9
Information Desk	16	*Stand Up	6,208	2.6
Information Desk	25	*Stand Up	5,460	2.3
Technical Services	24	Sit Down	5,869	2.4
Technical Serivces	07	Sit Down	2,844	1.2
Technical Services	08	Sit Down	2,210	.9
Second Floor				
	15	*Stand Up	5,909	2.5
	17	Sit Down	15,194	6.3
	18	Sit Down	13,874	5.8
	20	Sit Down	11,247	4.7
	19	Sit Down	15,775	6.6
	21	Sit Down	5,524	2.3
Third Floor				
	22	Sit Down	8,664	3.6
	23	Sit Down	8,738	3.6
Totals	22		239,972	100.0

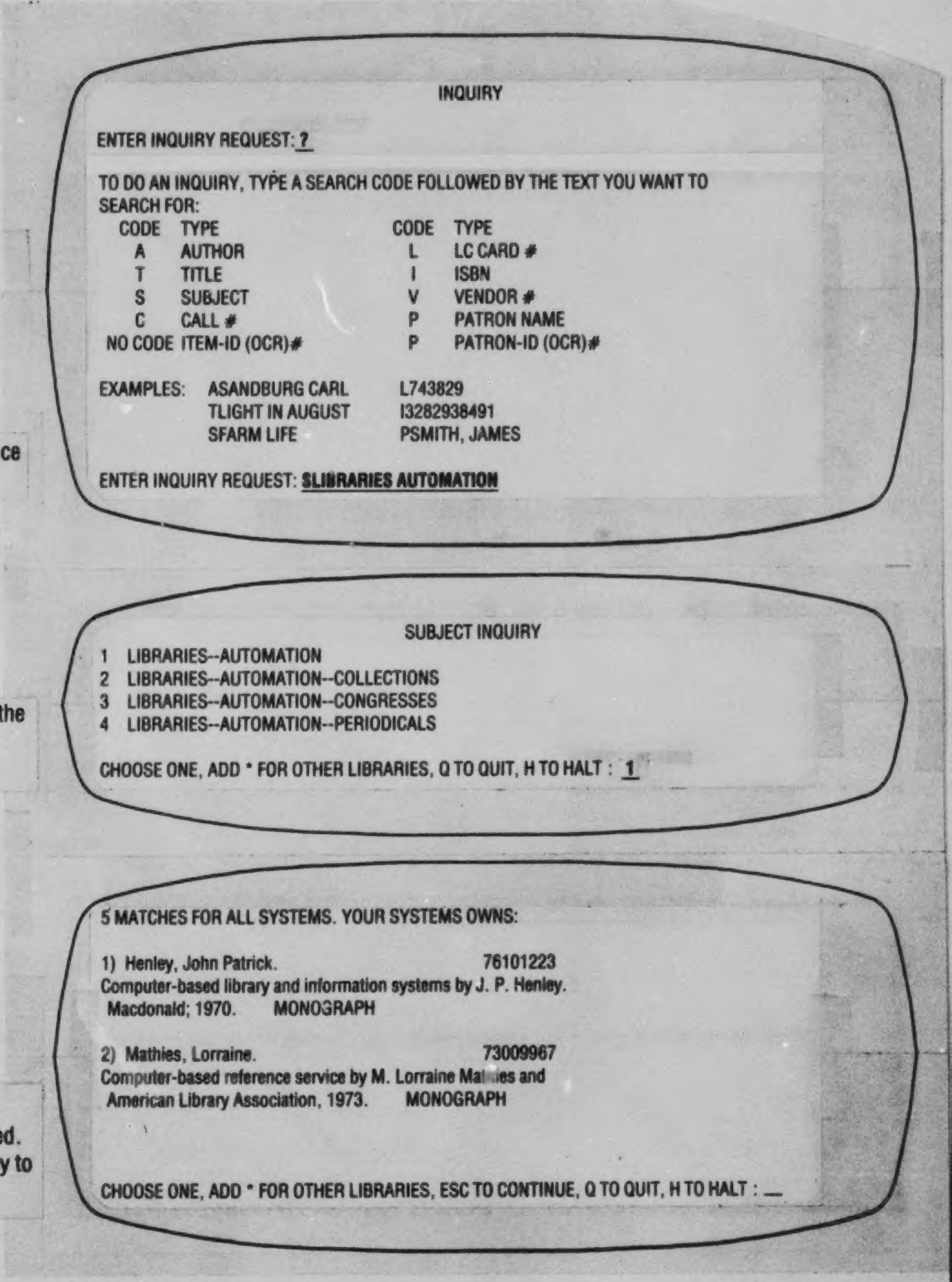
*Shared with patron/staff

Stephen F. Austin State University Library

The Steen Library at the Stephen F. Austin State University in Nacogdoches, Texas is an open stack library housed in a four-floor building containing approximately 750,000 volumes in all formats. The library serves a community consisting of about 11,000 students and 450 facility members and the general public in the surrounding community. The library contracted with DataPhase Systems Inc. to install a turnkey automated circulation system. The library decided to use the existing inquiry function of the automated circulation system without modification, to place terminals in the library and allow patrons to gain access to the library's machine-readable database using the automated circulation inquiry function. Thus the users were not using a true online catalog in terms of a system that was designed with a user-cordial interface. The Stephen F. Austin State University began to use the DataPhase Systems Inc. circulation system as a public access catalog in January 1980.

The DataPhase system utilizes a Data General Eclipse S/130 minicomputer with a programming language called MIIS, a proprietary version of ANSI standard MUMPS. A total of 19 terminals are attached directly to the computer system of which 10 are public access online catalog terminals. The system is a combination online catalog and circulation system.

The user can gain access to the approximately 100,000 records in the database using author, title, subject headings, and call number searches. EXHIBIT 6 illustrates the search process with some sample screens.



```
                              INQUIRY

ENTER INQUIRY REQUEST: ?

TO DO AN INQUIRY, TYPE A SEARCH CODE FOLLOWED BY THE TEXT YOU WANT TO
SEARCH FOR:
   CODE  TYPE                       CODE  TYPE
    A    AUTHOR                      L    LC CARD #
    T    TITLE                       I    ISBN
    S    SUBJECT                     V    VENDOR #
    C    CALL #                      P    PATRON NAME
 NO CODE ITEM-ID (OCR)#              P    PATRON-ID (OCR)#

EXAMPLES:   ASANDBURG CARL           L743829
            TLIGHT IN AUGUST         I3282938491
            SFARM LIFE               PSMITH, JAMES

ENTER INQUIRY REQUEST: SLIBRARIES AUTOMATION
```

User enters a ? to obtain assistance from the system.

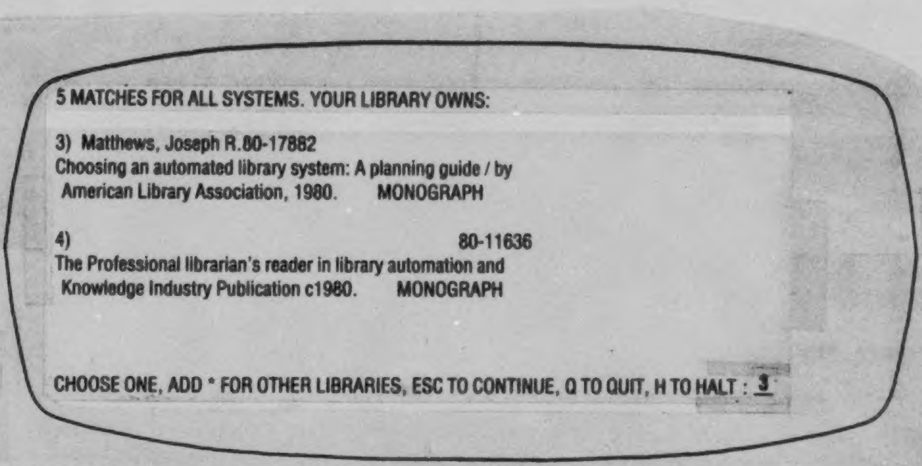
```
                              SUBJECT INQUIRY
1  LIBRARIES--AUTOMATION
2  LIBRARIES--AUTOMATION--COLLECTIONS
3  LIBRARIES--AUTOMATION--CONGRESSES
4  LIBRARIES--AUTOMATION--PERIODICALS

CHOOSE ONE, ADD * FOR OTHER LIBRARIES, Q TO QUIT, H TO HALT : 1
```

User enters a subject search and the appropriate subject holdings are displayed.

```
5 MATCHES FOR ALL SYSTEMS. YOUR SYSTEMS OWNS:

1) Henley, John Patrick.                          76101223
Computer-based library and information systems by J. P. Henley.
 Macdonald; 1970.      MONOGRAPH

2) Mathies, Lorraine.                             73009967
Computer-based reference service by M. Lorraine Mathies and
 American Library Association, 1973.      MONOGRAPH



CHOOSE ONE, ADD * FOR OTHER LIBRARIES, ESC TO CONTINUE, Q TO QUIT, H TO HALT : _
```

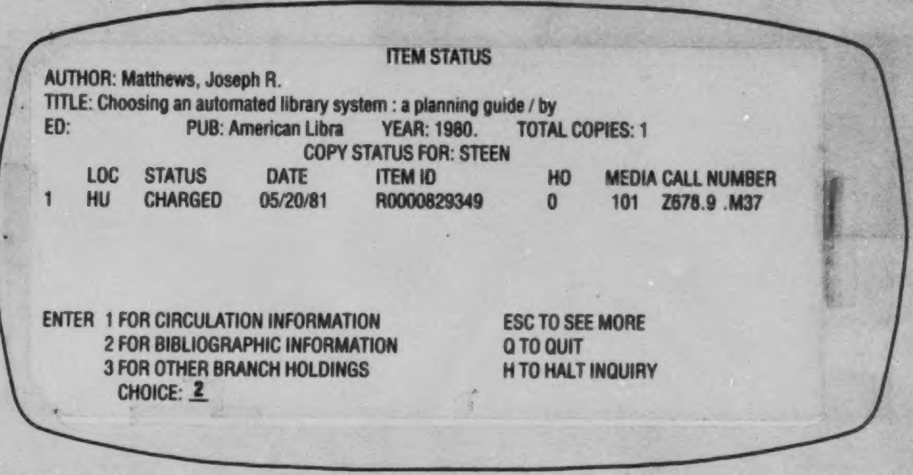
User selects line #1 and a brief display for two records is provided. User pushes the escape (ESC) key to see more records displayed.

EXHIBIT 6: Sample screens for the Stephen F. Austin State University (DataPhase Systems circulation system)



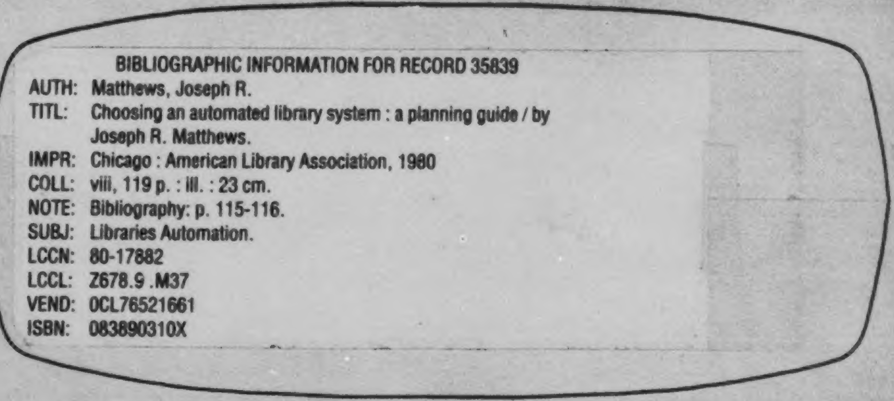
```
5 MATCHES FOR ALL SYSTEMS. YOUR LIBRARY OWNS:

3) Matthews, Joseph R.80-17882
Choosing an automated library system: A planning guide / by
 American Library Association, 1980.      MONOGRAPH

4)                                          80-11636
The Professional librarian's reader in library automation and
 Knowledge Industry Publication c1980.      MONOGRAPH


CHOOSE ONE, ADD * FOR OTHER LIBRARIES, ESC TO CONTINUE, Q TO QUIT, H TO HALT : 3
```

The user selects record #3.



```
                                 ITEM STATUS
AUTHOR: Matthews, Joseph R.
TITLE: Choosing an automated library system : a planning guide / by
ED:                PUB: American Libra    YEAR: 1980.    TOTAL COPIES: 1
                           COPY STATUS FOR: STEEN
     LOC   STATUS     DATE       ITEM ID            HO    MEDIA CALL NUMBER
1    HU    CHARGED    05/20/81   R0000829349        0     101   Z678.9 .M37


ENTER  1 FOR CIRCULATION INFORMATION               ESC TO SEE MORE
       2 FOR BIBLIOGRAPHIC INFORMATION             Q TO QUIT
       3 FOR OTHER BRANCH HOLDINGS                 H TO HALT INQUIRY
         CHOICE: 2
```

A brief record display combined with copy specific location and status information. User requests more bibliographic information.



```
         BIBLIOGRAPHIC INFORMATION FOR RECORD 35839
AUTH:  Matthews, Joseph R.
TITL:  Choosing an automated library system : a planning guide / by
       Joseph R. Matthews.
IMPR:  Chicago : American Library Association, 1980
COLL:  viii, 119 p. : ill. : 23 cm.
NOTE:  Bibliography: p. 115-116.
SUBJ:  Libraries Automation.
LCCN:  80-17882
LCCL:  Z678.9 .M37
VEND:  OCL76521661
ISBN:  083890310X
```

Full record display.

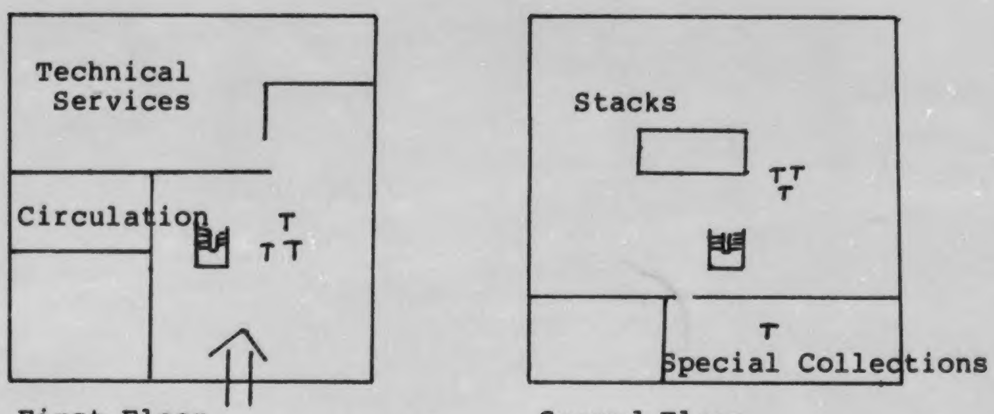
EXHIBIT 6 (continued)

EXHIBIT 7 shows the location of the online catalog terminals in the Steen Library. Library staff developed a one page handout explaining how to use the online catalog terminals.

West Valley Joint Community College District

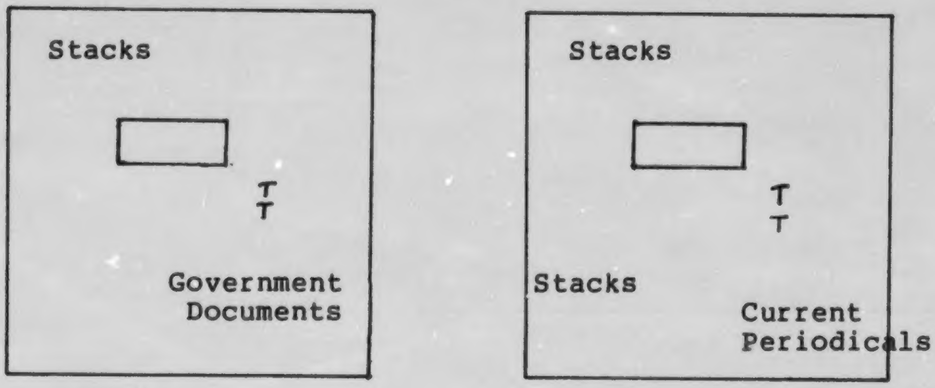
The West Valley Joint Community College District is located in the County of Santa Clara, CA and is composed of two community colleges - Mission College and West Valley College. These two community colleges serve approximately 19,000 students. In 1979 the two colleges contracted with Universal Library Systems, a turnkey vendor, to deliver an automated circulation system and to develop an online public access catalog for the two college libraries.

Universal Library Systems (ULISYS) utilizes a Digital Equipment Corporation PDP 11/70 minicomputer and the application software is written in BASIC PLUS. There are a total of 33 terminals linked to the computer system and, of these, five terminals at Mission College and five at West Valley College are public access catalog terminals. The computer system is located at Mission College and is linked via telephone lines to West Valley College, located some 15 miles away. There are about 79,000 records in the computer base and the library patron may search by author, title, combination of author and any title word, subject headings, call number, and by course and instructor for items located in the reserve book room. The holdings of both campus libraries are


Technical
Services
Circulation
T
T T
Stacks
T T
T
T
Special Collections

First Floor

Second Floor


Stacks
T
T
Government
Documents
Stacks
T
T
Stacks
Current
Periodicals

Third Floor

Fourth Floor

EXHIBIT 7: Online Catalog Terminal Locations
in the Steen Library at
Stephen F. Austin State University

displayed for the user. EXHIBIT 8 provides some sample screens. Explicit boolean searching and keyword or term searching capabilities are not currently available on the ULISYS system.

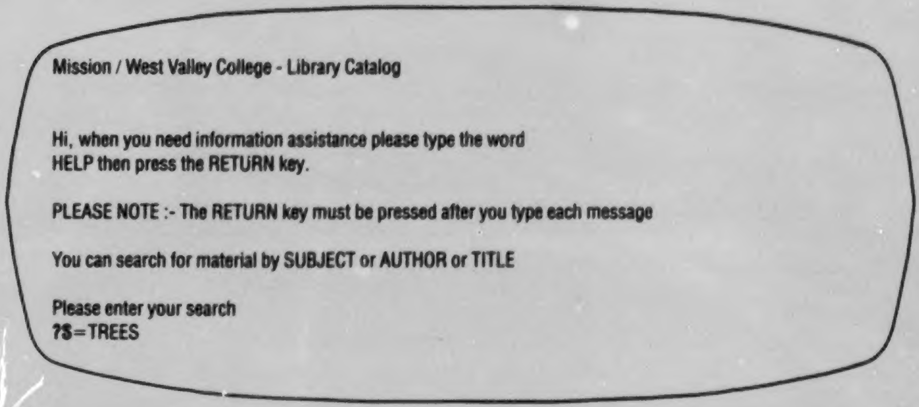
A one page handout explaining the basic system capabilities and attractive brochures were designed by library staff members to aid in the introduction of the online catalog to library patrons.

EXHIBIT 9 identifies the locations of the public access online catalog terminals at both Mission College and West Valley College Learning Resources Centers. EXHIBIT 10 shows the distribution of transactions by each terminal location within the two libraries. Over half of the inquiry transactions originate at West Valley College and the vast majority of transactions are entered by patrons at the public access online catalog terminals. The number of transactions that result in finding one or more records (a hit) is 63 percent.

Evanston Public Library

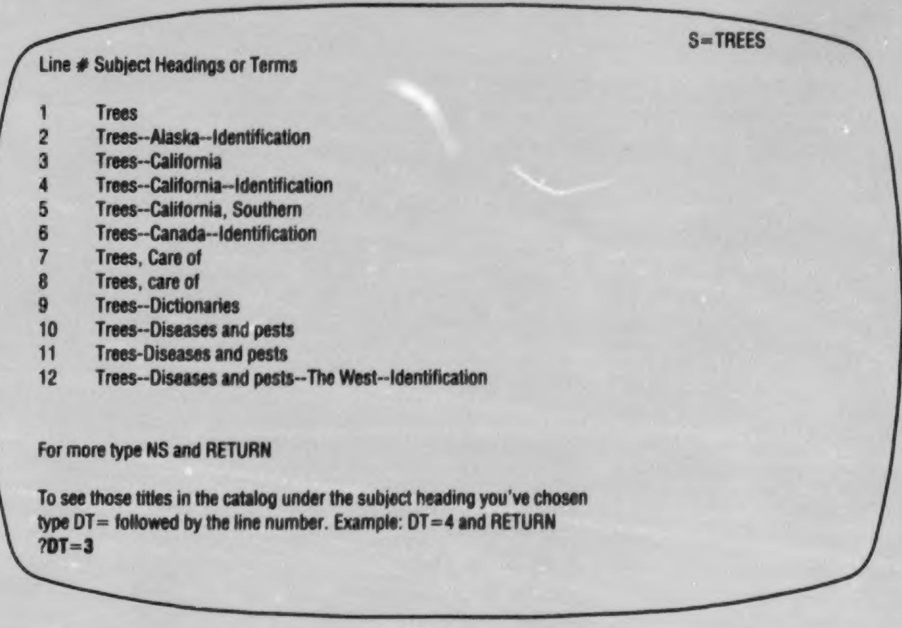
The Evanston Public Library, located just north of Chicago, has approximately 48,000 registered borrowers. The Evanston Public Library uses the CL Systems, Inc. (CLSI) turnkey automated circulation system -- the LIBS 100 system. In October 1980, the system was expanded and patrons have been locating library materials through a Public Access Catalog (PAC). The CLSI Public Access Catalog uses a touch-sensitive online terminal in lieu of a standard CRT keyboard terminal.

Initial display screen and user enters command for a subject search.



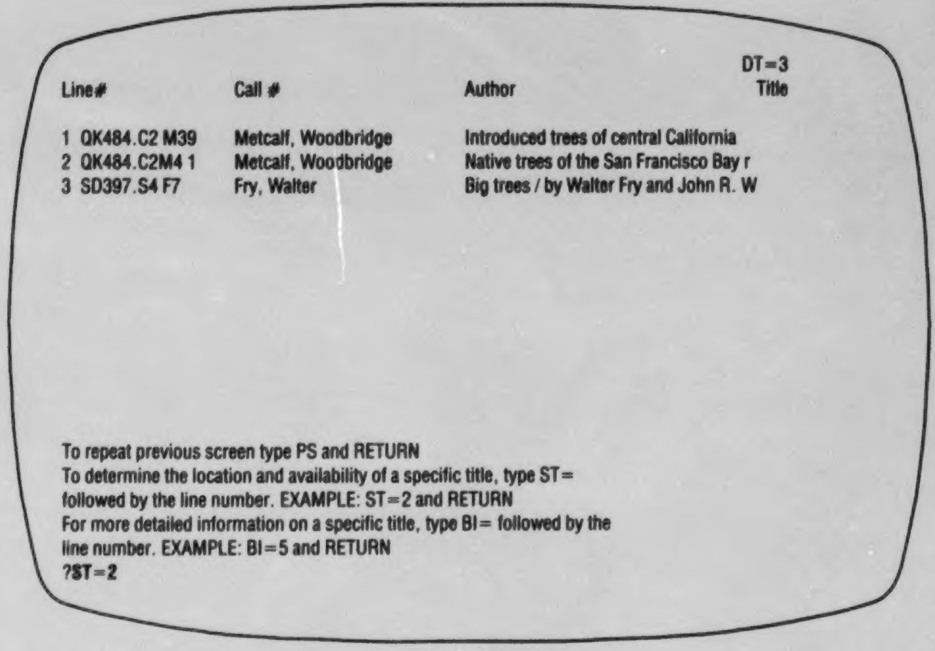
```
Mission / West Valley College - Library Catalog

Hi, when you need information assistance please type the word
HELP then press the RETURN key.

PLEASE NOTE :- The RETURN key must be pressed after you type each message

You can search for material by SUBJECT or AUTHOR or TITLE

Please enter your search
?S=TREES
```

System responds with a display of the subject authority control file. User requests a display of associated titles for line #3.



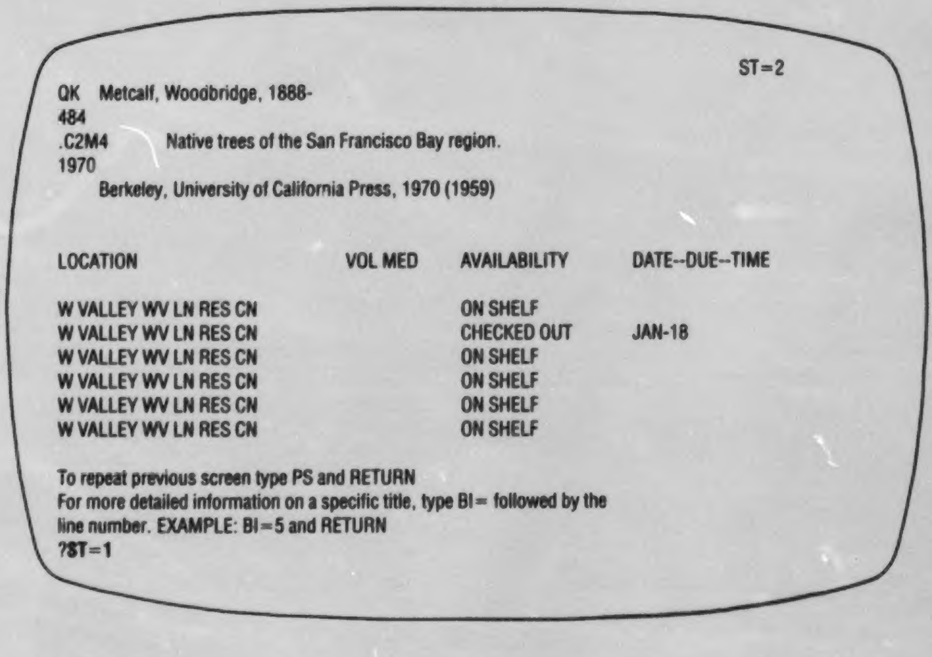
```
                                                        S=TREES
Line # Subject Headings or Terms

1      Trees
2      Trees--Alaska--Identification
3      Trees--California
4      Trees--California--Identification
5      Trees--California, Southern
6      Trees--Canada--Identification
7      Trees, Care of
8      Trees, care of
9      Trees--Dictionaries
10     Trees--Diseases and pests
11     Trees-Diseases and pests
12     Trees--Diseases and pests--The West--Identification


For more type NS and RETURN

To see those titles in the catalog under the subject heading you've chosen
type DT= followed by the line number. Example: DT=4 and RETURN
?DT=3
```

EXHIBIT 8: Sample screens for the Mission College/West Valley College System. (Universal Library Systems)



```
                                                                  DT=3
Line#              Call #                  Author                 Title

1 QK484.C2 M39     Metcalf, Woodbridge     Introduced trees of central California
2 QK484.C2M4 1     Metcalf, Woodbridge     Native trees of the San Francisco Bay r
3 SD397.S4 F7      Fry, Walter             Big trees / by Walter Fry and John R. W








To repeat previous screen type PS and RETURN
To determine the location and availability of a specific title, type ST=
followed by the line number. EXAMPLE: ST=2 and RETURN
For more detailed information on a specific title, type BI= followed by the
line number. EXAMPLE: BI=5 and RETURN
?ST=2
```

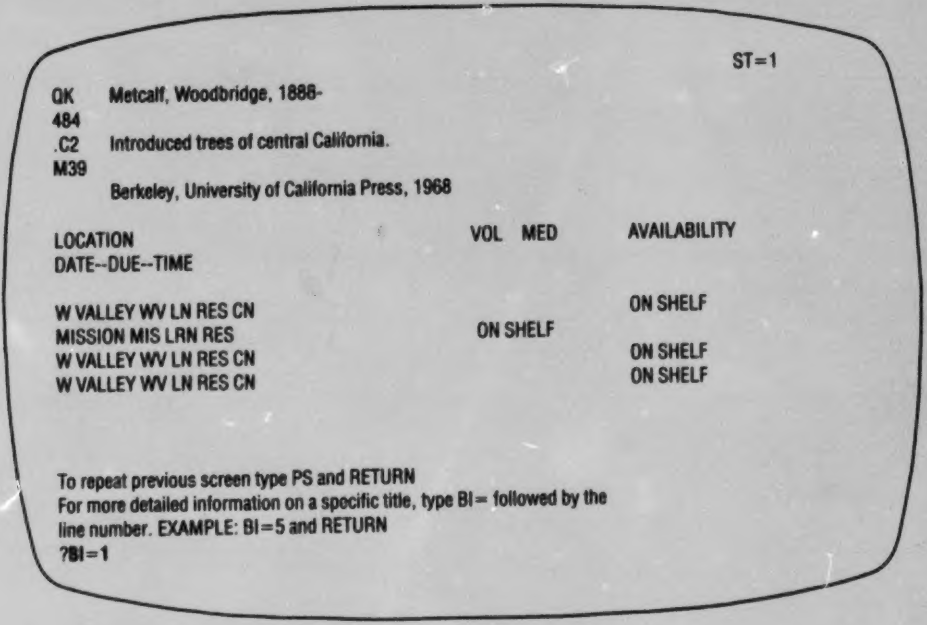
Brief record display and user requests a status display for title #2.



```
                                                                  ST=2
QK    Metcalf, Woodbridge, 1888-
484
.C2M4       Native trees of the San Francisco Bay region.
1970
      Berkeley, University of California Press, 1970 (1959)


LOCATION                    VOL MED    AVAILABILITY      DATE--DUE--TIME

W VALLEY WV LN RES CN                  ON SHELF
W VALLEY WV LN RES CN                  CHECKED OUT       JAN-18
W VALLEY WV LN RES CN                  ON SHELF
W VALLEY WV LN RES CN                  ON SHELF
W VALLEY WV LN RES CN                  ON SHELF
W VALLEY WV LN RES CN                  ON SHELF

To repeat previous screen type PS and RETURN
For more detailed information on a specific title, type BI= followed by the
line number. EXAMPLE: BI=5 and RETURN
?ST=1
```

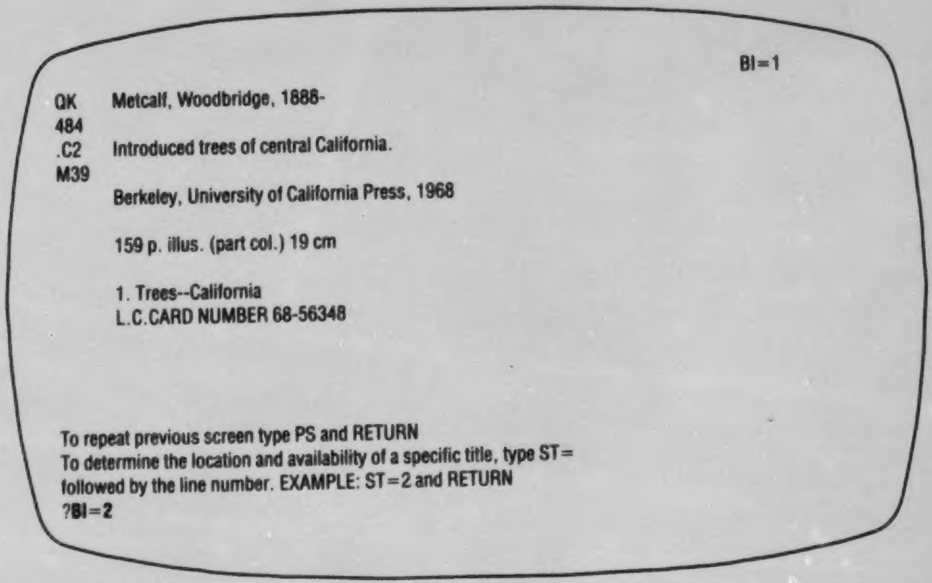
Short record and status display for title #2. User requests status display for title #1 from brief record display.

EXHIBIT 8 (continued)



```
                                                                ST=1
QK    Metcalf, Woodbridge, 1888-
484
.C2   Introduced trees of central California.
M39
      Berkeley, University of California Press, 1968

LOCATION                              VOL   MED        AVAILABILITY
DATE--DUE--TIME

W VALLEY WV LN RES CN                                  ON SHELF
MISSION MIS LRN RES                   ON SHELF
W VALLEY WV LN RES CN                                  ON SHELF
W VALLEY WV LN RES CN                                  ON SHELF


To repeat previous screen type PS and RETURN
For more detailed information on a specific title, type BI= followed by the
line number. EXAMPLE: BI=5 and RETURN
?BI=1
```

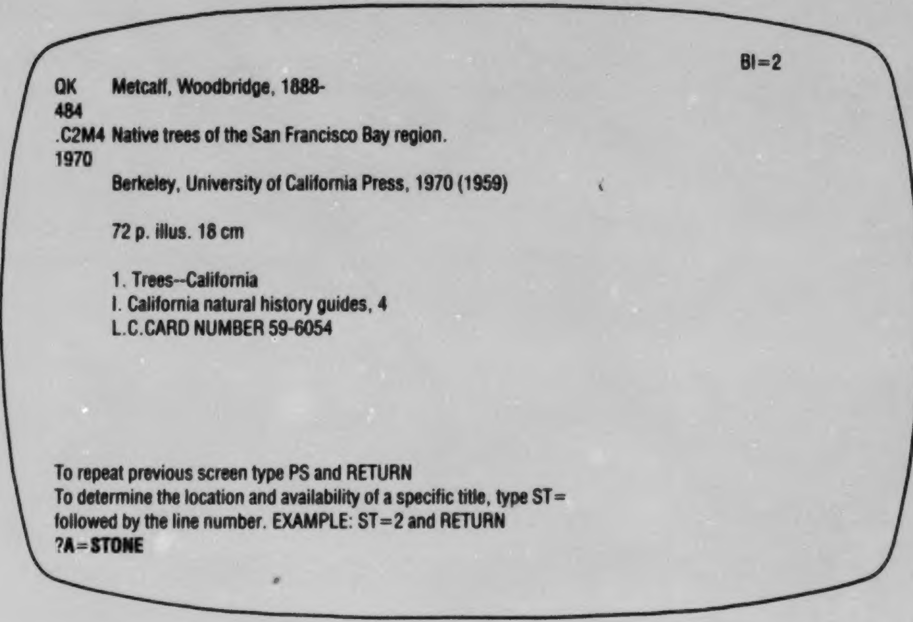
Status display. User requests display of bibliographic information for item #1.



```
                                                                BI=1
QK    Metcalf, Woodbridge, 1888-
484
.C2   Introduced trees of central California.
M39
      Berkeley, University of California Press, 1968

      159 p. illus. (part col.) 19 cm

      1. Trees--California
      L.C.CARD NUMBER 68-56348


To repeat previous screen type PS and RETURN
To determine the location and availability of a specific title, type ST=
followed by the line number. EXAMPLE: ST=2 and RETURN
?BI=2
```

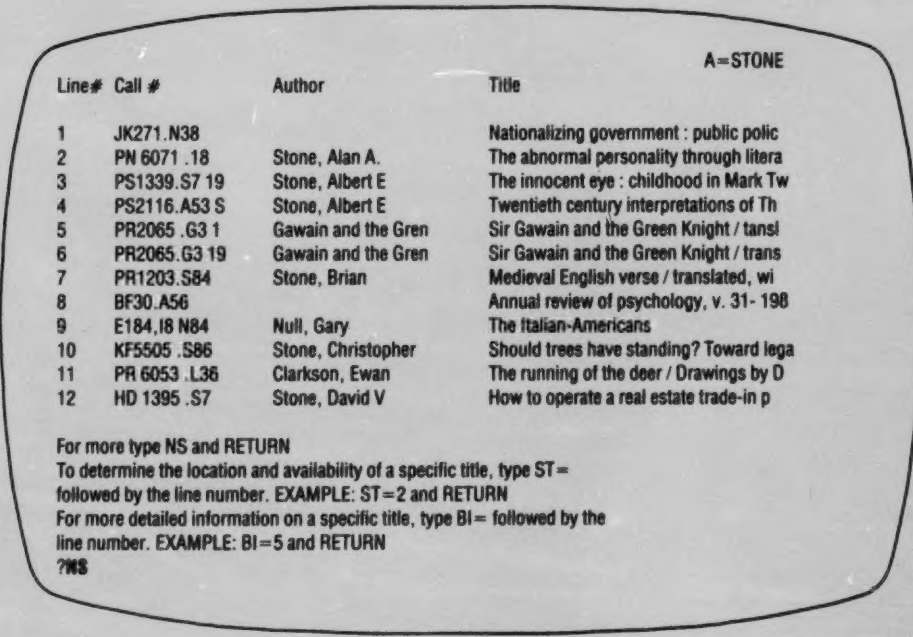
Full record display. User requests full record display for title #2.

EXHIBIT 8 (continued)



```
                                                          BI=2
QK     Metcalf, Woodbridge, 1888-
484
.C2M4  Native trees of the San Francisco Bay region.
1970
       Berkeley, University of California Press, 1970 (1959)

       72 p. illus. 18 cm

       1. Trees--California
       I. California natural history guides, 4
       L.C.CARD NUMBER 59-6054




To repeat previous screen type PS and RETURN
To determine the location and availability of a specific title, type ST=
followed by the line number. EXAMPLE: ST=2 and RETURN
?A=STONE
```

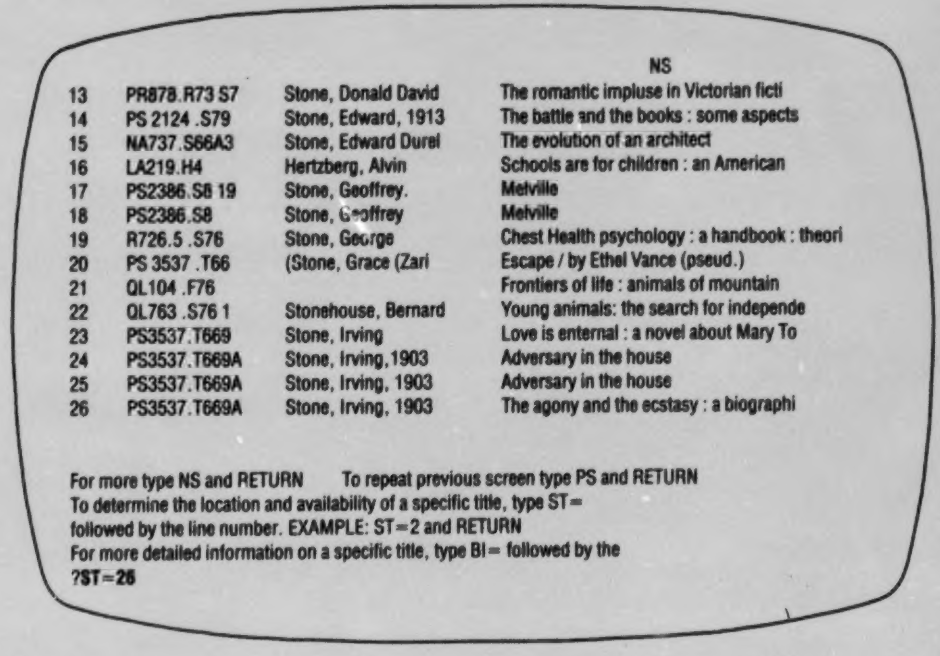
Full record display. User enters author search command.



```
                                                          A=STONE
Line# Call #          Author                  Title

1     JK271.N38                               Nationalizing government : public polic
2     PN 6071 .18     Stone, Alan A.          The abnormal personality through litera
3     PS1339.S7 19    Stone, Albert E         The innocent eye : childhood in Mark Tw
4     PS2116.A53 S    Stone, Albert E         Twentieth century interpretations of Th
5     PR2065 .G3 1    Gawain and the Gren     Sir Gawain and the Green Knight / tansl
6     PR2065.G3 19    Gawain and the Gren     Sir Gawain and the Green Knight / trans
7     PR1203.S84      Stone, Brian            Medieval English verse / translated, wi
8     BF30.A56                                Annual review of psychology, v. 31- 198
9     E184,I8 N84     Null, Gary              The Italian-Americans
10    KF5505 .S86     Stone, Christopher      Should trees have standing? Toward lega
11    PR 6053 .L36    Clarkson, Ewan          The running of the deer / Drawings by D
12    HD 1395 .S7     Stone, David V          How to operate a real estate trade-in p

For more type NS and RETURN
To determine the location and availability of a specific title, type ST=
followed by the line number. EXAMPLE: ST=2 and RETURN
For more detailed information on a specific title, type BI= followed by the
line number. EXAMPLE: BI=5 and RETURN
?NS
```

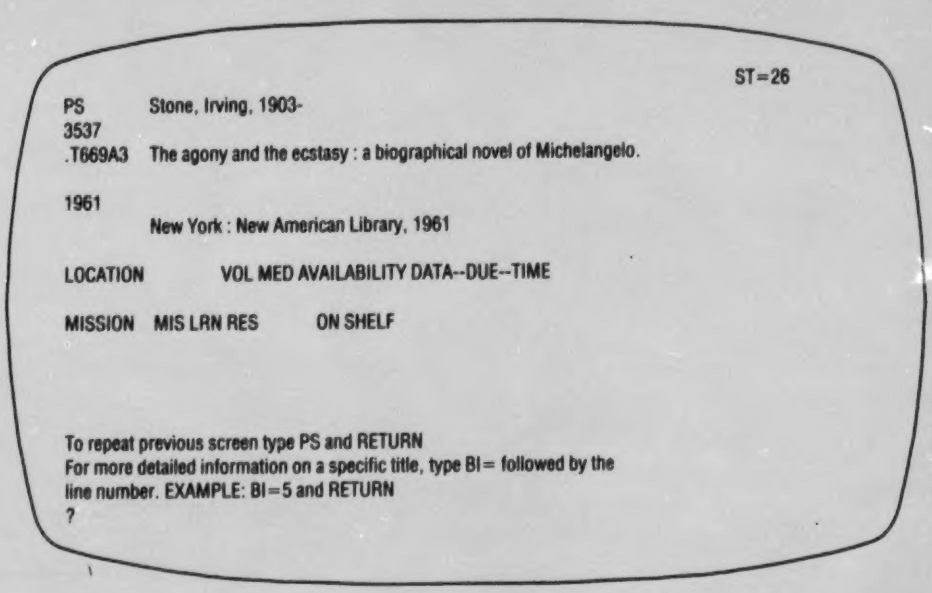
System responds with a brief record display. User requests additional records to be displayed.

EXHIBIT 8 (continued)



```
                                                                      NS
13    PR878.R73 S7       Stone, Donald David       The romantic impluse in Victorian ficti
14    PS 2124 .S79       Stone, Edward, 1913       The battle and the books : some aspects
15    NA737.S66A3        Stone, Edward Durel       The evolution of an architect
16    LA219.H4           Hertzberg, Alvin          Schools are for children : an American
17    PS2386.S8 19       Stone, Geoffrey.          Melville
18    PS2386.S8          Stone, Geoffrey           Melville
19    R726.5 .S76        Stone, George             Chest Health psychology : a handbook : theori
20    PS 3537 .T66       (Stone, Grace (Zari       Escape / by Ethel Vance (pseud.)
21    QL104 .F76                                   Frontiers of life : animals of mountain
22    QL763 .S76 1       Stonehouse, Bernard       Young animals: the search for independe
23    PS3537.T669        Stone, Irving             Love is enternal : a novel about Mary To
24    PS3537.T669A       Stone, Irving,1903        Adversary in the house
25    PS3537.T669A       Stone, Irving, 1903       Adversary in the house
26    PS3537.T669A       Stone, Irving, 1903       The agony and the ecstasy : a biographi


For more type NS and RETURN      To repeat previous screen type PS and RETURN
To determine the location and availability of a specific title, type ST=
followed by the line number. EXAMPLE: ST=2 and RETURN
For more detailed information on a specific title, type BI= followed by the
?ST=26
```

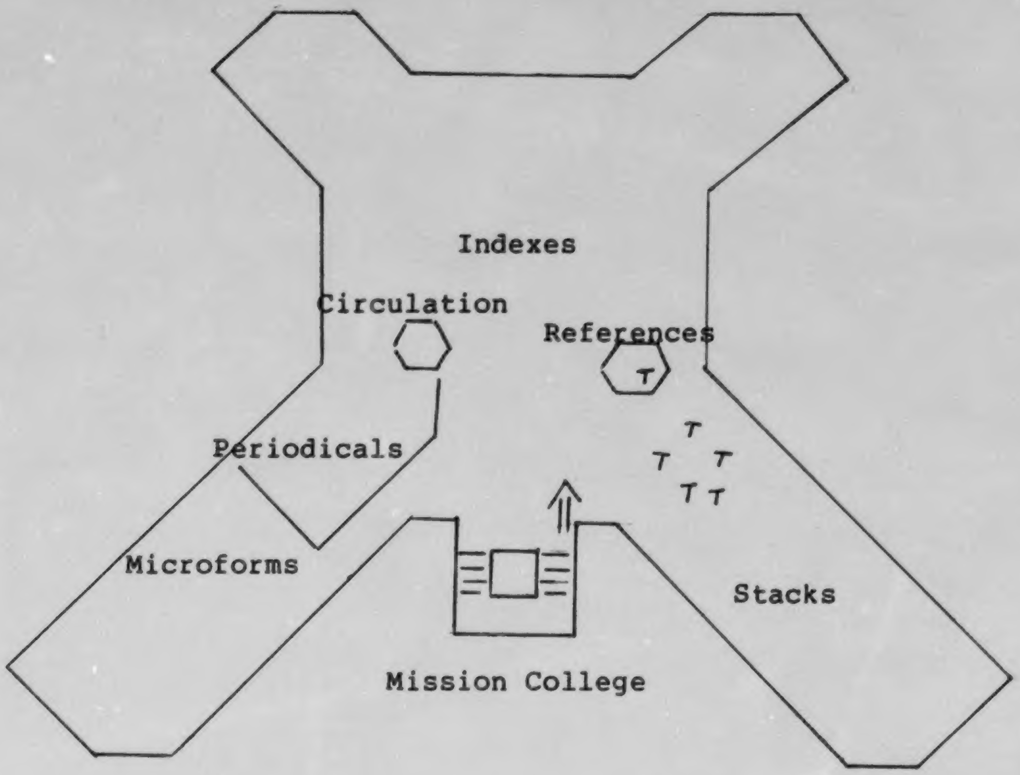
Brief record display. User requests status display for line #26.



```
                                                                  ST=26
PS        Stone, Irving, 1903-
3537
.T669A3   The agony and the ecstasy : a biographical novel of Michelangelo.

1961
          New York : New American Library, 1961

LOCATION          VOL MED AVAILABILITY DATA--DUE--TIME

MISSION   MIS LRN RES          ON SHELF



To repeat previous screen type PS and RETURN
For more detailed information on a specific title, type BI= followed by the
line number. EXAMPLE: BI=5 and RETURN
?
```

Short record and copy level information display.

EXHIBIT 8 (continued)


Indexes
Circulation
References
T
T
T T
T T
Periodicals
Microforms
Stacks
Mission College

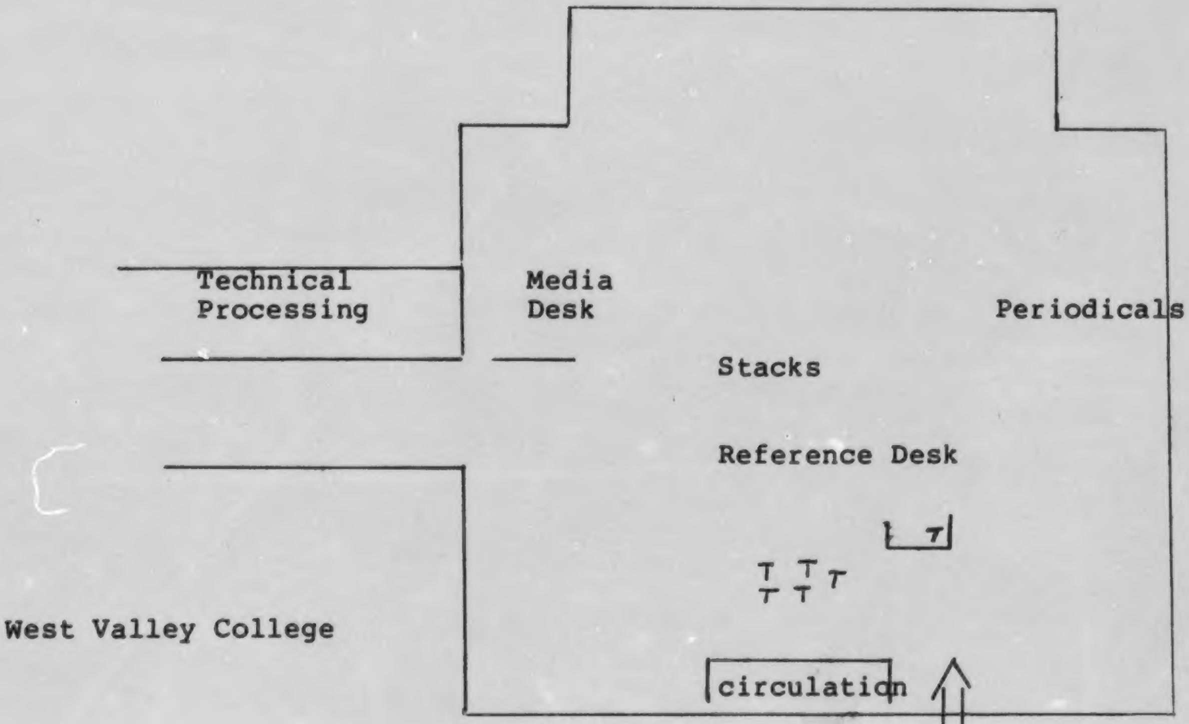

Technical Processing
Media Desk
Periodicals
Stacks
Reference Desk
T
T T T
T T
West Valley College
circulation

EXHIBIT 9 : Online Catalog Terminal Locations at Mission and West Valley Colleges Libraries

EXHIBIT 10: Volume of Transactions at Mission/West Valley College Libraries during October, 1981

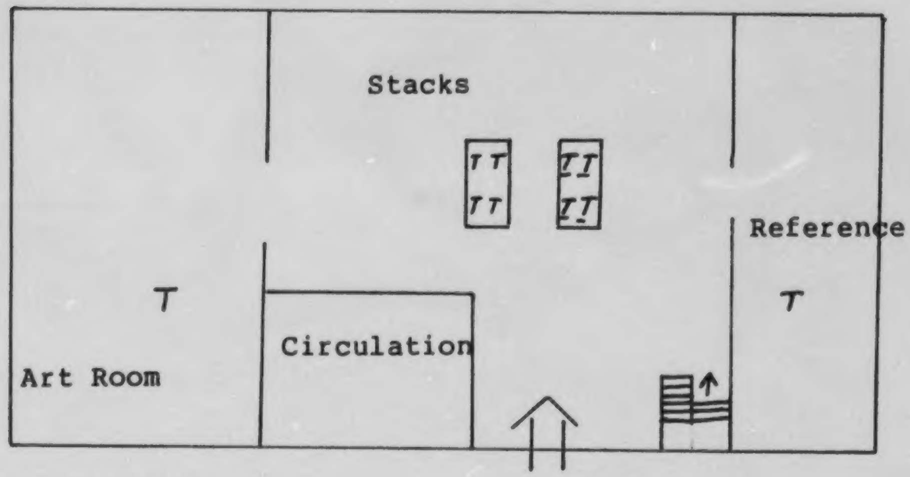
Location	Terminal ID#	Stand up Sit down	Number of Transactions	Percent of Total Transactions %	Number of Transactions Retrieving Records	Percent of Transactions Retrieving Records %
Mission College						
Catalog Area	15	Sit down	1,922	7.3	1,170	61
	19	Sit down	1,649	6.3	900	55
	21	Sit down	1,448	5.5	801	55
	22	Sit down	2,075	7.9	1,371	66
	23	Sit down	764	2.9	446	58
Subtotal			7,858	30.0	4,687	60
Reference Desk	20	Stand up	804	3.0	569	71
West Valley College						
Catalog Area	28	Stand up	4,785	18.2	2,976	62
	29	Stand up	482	1.8	302	63
	*30	Stand up	2,443	9.3	1,580	65
	*31	Stand up	4,588	17.5	3,168	69
	32	Stand up	2,298	8.7	1,329	58
Subtotal			14,596	55.7	9,355	64
Reference Desk	38	Stand up	2,916	11.1	1,823	63
TOTALS			26,174	100%	16,434	63

*Interchangeable terminals

The CLSI system runs on a Digital Equipment Corporation PDP 11/34 minicomputer and the software is programmed in MACRO 11 and assembly level programming language. Fifteen touch screen public access catalog terminals are linked to the computer system. Tweleve of these touch screen terminals are located in the main library and 3 are located in branches. The locations of the touch screen terminals at the Evanston Public Library are shown in EXHIBIT 11.

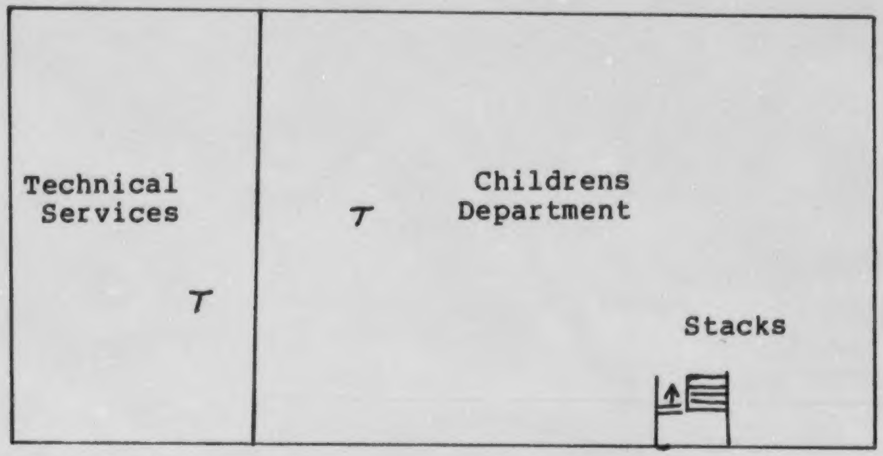
The Evanston Public Library's computer database has records for about 219,000 unique titles and approximately 324,000 copies. During the data collection period for this study, approximately 60 percent of the records contained subject headings and a retrospective conversion project was underway to provide full MARC records for the total collection. The library patron, using a touch screen terminal, can gain access to the database using author, title, and subject heading searches. The computer system displays on the screen a series of choices and patrons indicate their choice by touching the screen in the appropriate location. The computer accepts this input and in turn displays another series of choices for the library patron. In all, 7 touches to the screen are required to gain access to a specific individual record. EXHIBIT 12 illustrates a typical search.

The library's staff developed a one page public access catalog instruction sheet as an aid to assist patrons in using the online catalog.



Stacks
T T
T T
T T
T T
Reference
T
T
Circulation
Art Room

First Floor

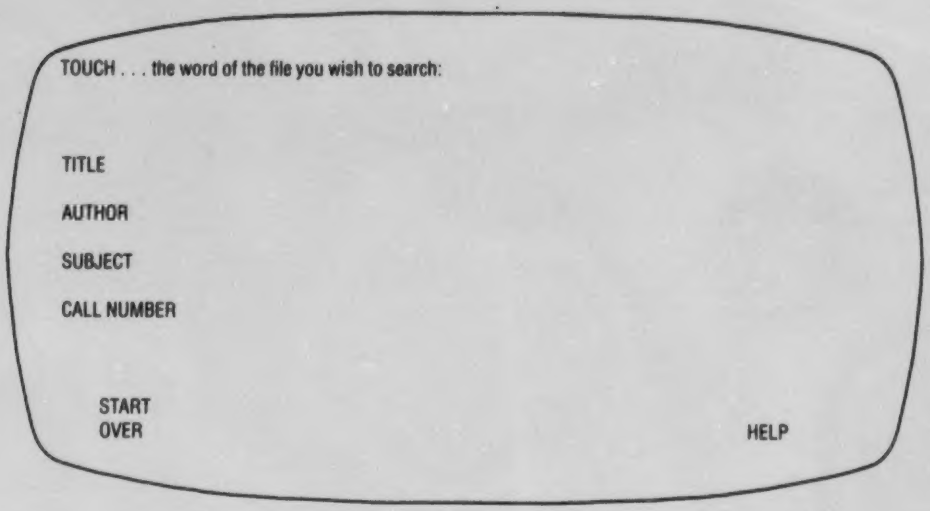


Technical Services
T
T
Childrens Department
Stacks

Second Floor

T = Sit down Terminal
T = Stand up Terminal

EXHIBIT11: Online Catalog Terminal Locations at the Evanston Public Library



TOUCH . . . the word of the file you wish to search:

TITLE

AUTHOR

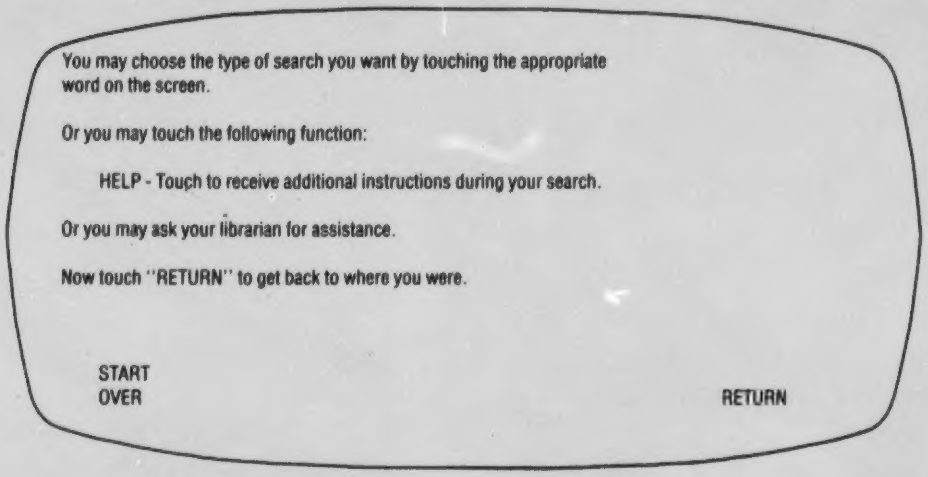
SUBJECT

CALL NUMBER

START
OVER

HELP

Initial screen, user touches "HELP."



You may choose the type of search you want by touching the appropriate word on the screen.

Or you may touch the following function:

HELP - Touch to receive additional instructions during your search.

Or you may ask your librarian for assistance.

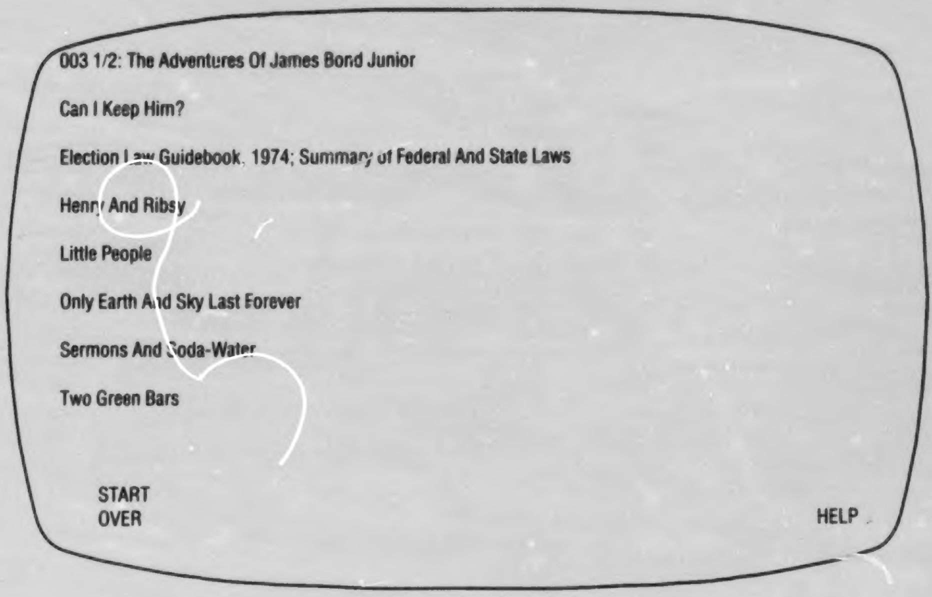
Now touch "RETURN" to get back to where you were.

START
OVER

RETURN

First Help screen and user touches "RETURN." User then touches "TITLE."

EXHIBIT 12: Sample screens for the Evanston Public Library (CL Systems, Inc. Systems)



003 1/2: The Adventures Of James Bond Junior

Can I Keep Him?

Election Law Guidebook. 1974; Summary of Federal And State Laws

Henry And Ribsy

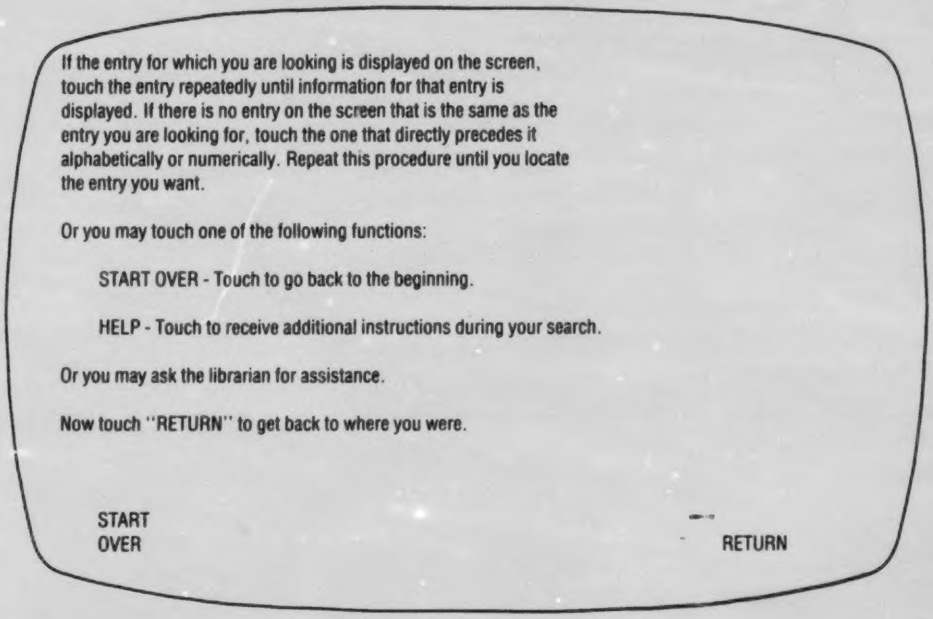
Little People

Only Earth And Sky Last Forever

Sermons And Soda-Water

Two Green Bars

First screen displayed after touching "TITLE."



If the entry for which you are looking is displayed on the screen, touch the entry repeatedly until information for that entry is displayed. If there is no entry on the screen that is the same as the entry you are looking for, touch the one that directly precedes it alphabetically or numerically. Repeat this procedure until you locate the entry you want.

Or you may touch one of the following functions:

START OVER - Touch to go back to the beginning.

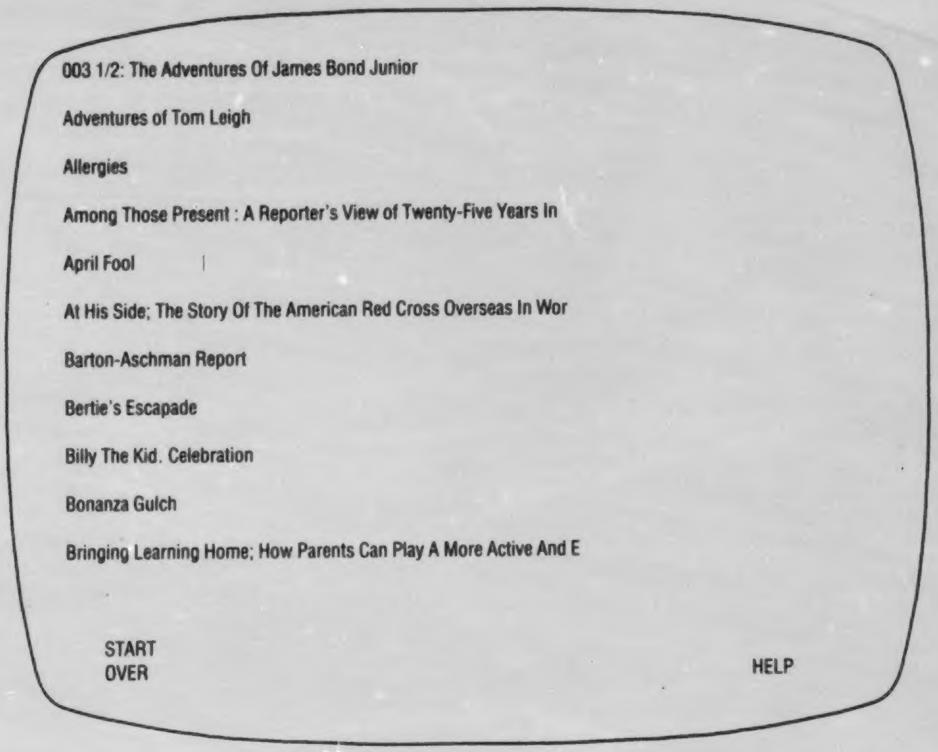
HELP - Touch to receive additional instructions during your search.

Or you may ask the librarian for assistance.

Now touch "RETURN" to get back to where you were.

User touches "HELP" and system displays this screen. User then touches "RETURN" and previous screen is displayed.

EXHIBIT 12 (continued)



003 1/2: The Adventures Of James Bond Junior

Adventures of Tom Leigh

Allergies

Among Those Present : A Reporter's View of Twenty-Five Years In

April Fool

At His Side; The Story Of The American Red Cross Overseas In Wor

Barton-Aschman Report

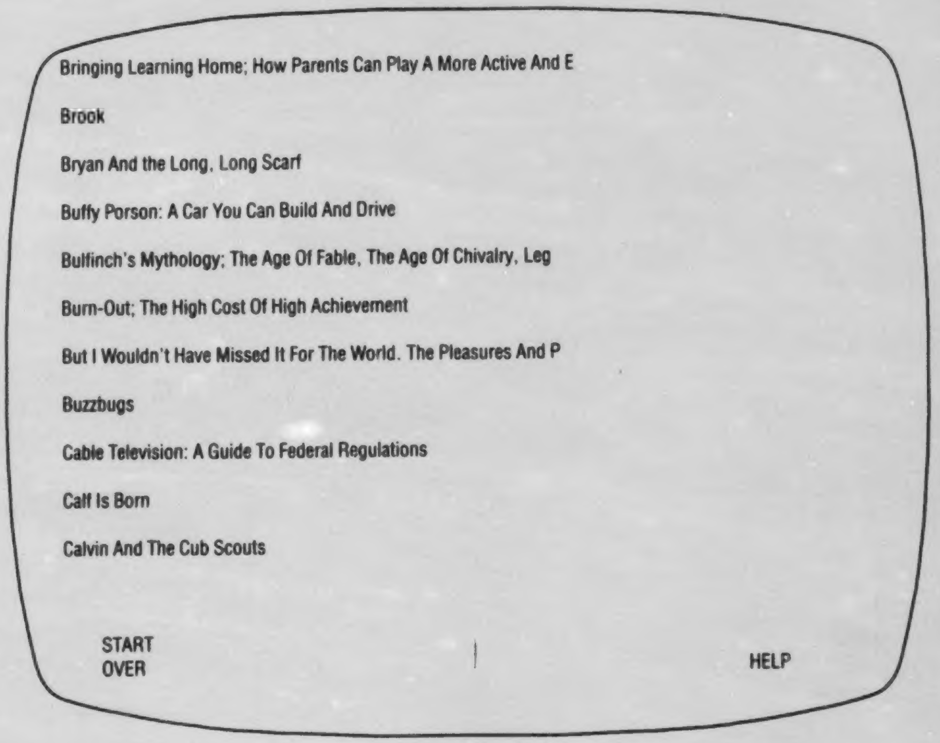
Bertie's Escapade

Billy The Kid. Celebration

Bonanza Gulch

Bringing Learning Home; How Parents Can Play A More Active And E

User touches "003 ½: The Adventures of James Bond Junior" and this second level title screen is displayed. User now touches "Bringing Learning Home; How Parents etc."



Bringing Learning Home; How Parents Can Play A More Active And E

Brook

Bryan And the Long, Long Scarf

Buffy Porson: A Car You Can Build And Drive

Bulfinch's Mythology; The Age Of Fable, The Age Of Chivalry, Leg

Burn-Out; The High Cost Of High Achievement

But I Wouldn't Have Missed It For The World. The Pleasures And P

Buzzbugs

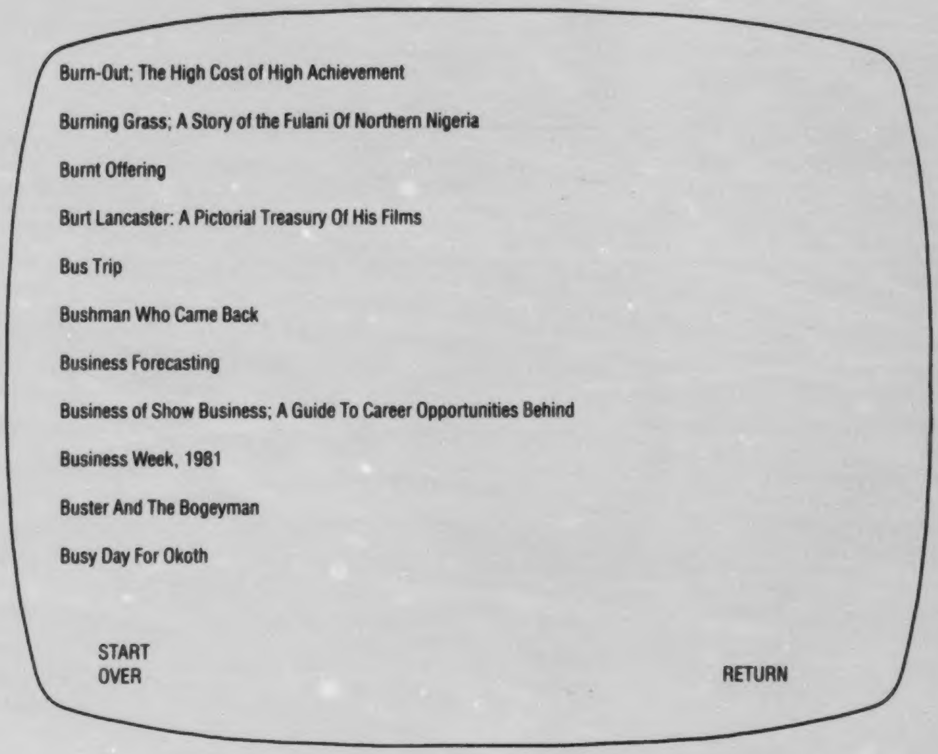
Cable Television: A Guide To Federal Regulations

Calf Is Born

Calvin And The Cub Scouts

Third level title screen is displayed. User touches "Burn-Out; The High Cost of Achievement."

EXHIBIT 12 (continued)



Burn-Out; The High Cost of High Achievement

Burning Grass; A Story of the Fulani Of Northern Nigeria

Burnt Offering

Burt Lancaster: A Pictorial Treasury Of His Films

Bus Trip

Bushman Who Came Back

Business Forecasting

Business of Show Business; A Guide To Career Opportunities Behind

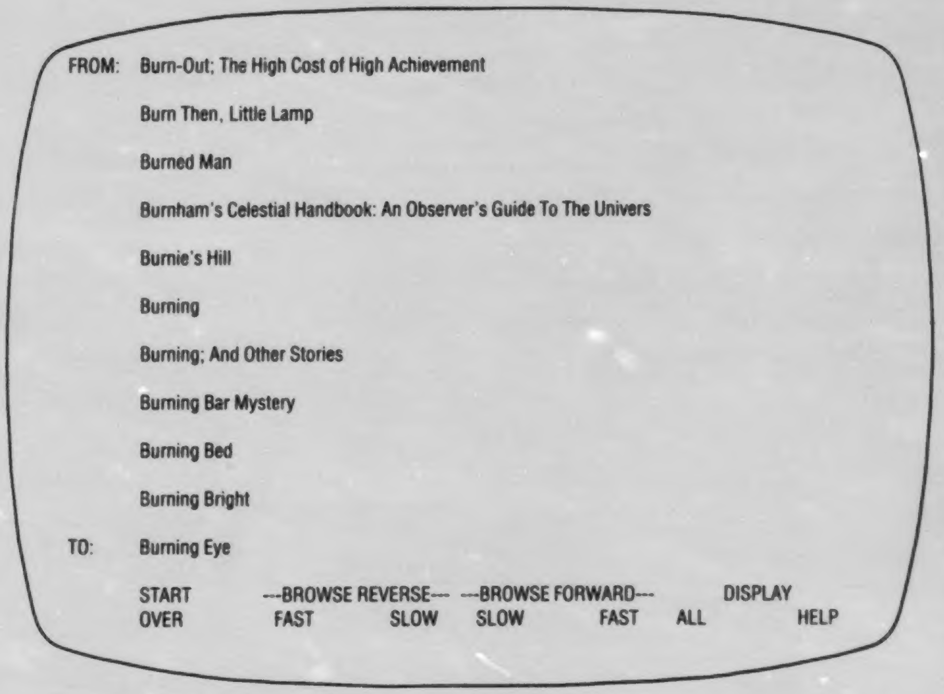
Business Week, 1981

Buster And The Bogeyman

Busy Day For Okoth

START
OVER
RETURN

Fourth level title screen is displayed. User touches "Burn-Out; etc."



FROM: Burn-Out; The High Cost of High Achievement

Burn Then, Little Lamp

Burned Man

Burnham's Celestial Handbook: An Observer's Guide To The Univers

Burnie's Hill

Burning

Burning; And Other Stories

Burning Bar Mystery

Burning Bed

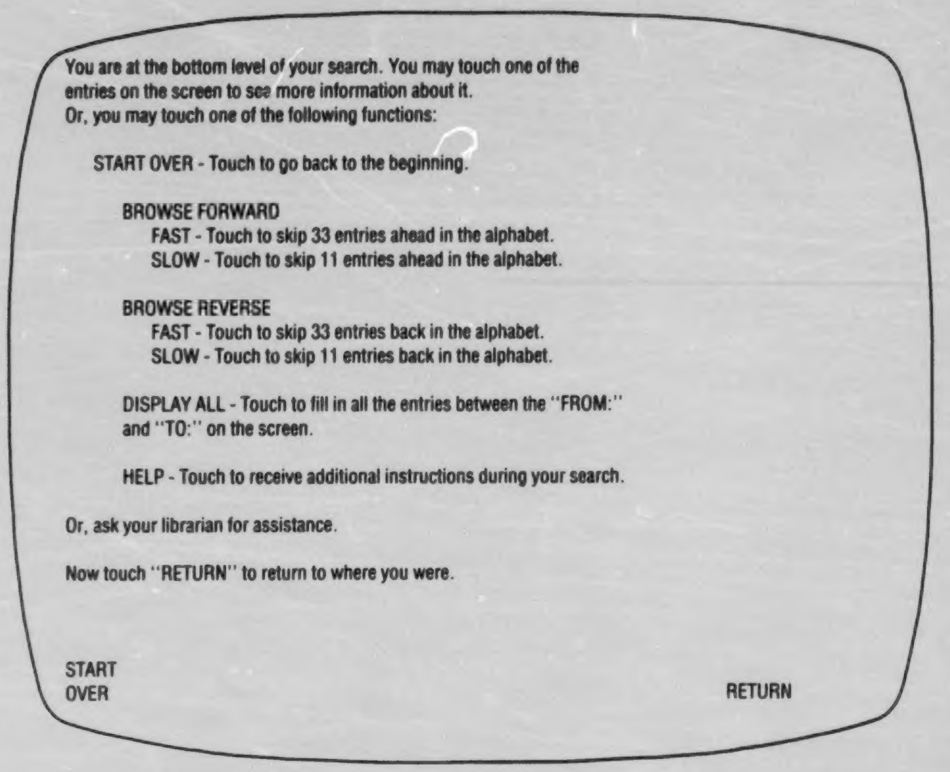
Burning Bright

TO: Burning Eye

START
OVER
---BROWSE REVERSE---
FAST
SLOW
---BROWSE FORWARD---
SLOW
FAST
DISPLAY
ALL
HELP

Fifth level title screen is displayed. User touches "HELP."

EXHIBIT 12 (continued)



You are at the bottom level of your search. You may touch one of the entries on the screen to see more information about it.
Or, you may touch one of the following functions:

START OVER - Touch to go back to the beginning.

BROWSE FORWARD
FAST - Touch to skip 33 entries ahead in the alphabet.
SLOW - Touch to skip 11 entries ahead in the alphabet.

BROWSE REVERSE
FAST - Touch to skip 33 entries back in the alphabet.
SLOW - Touch to skip 11 entries back in the alphabet.

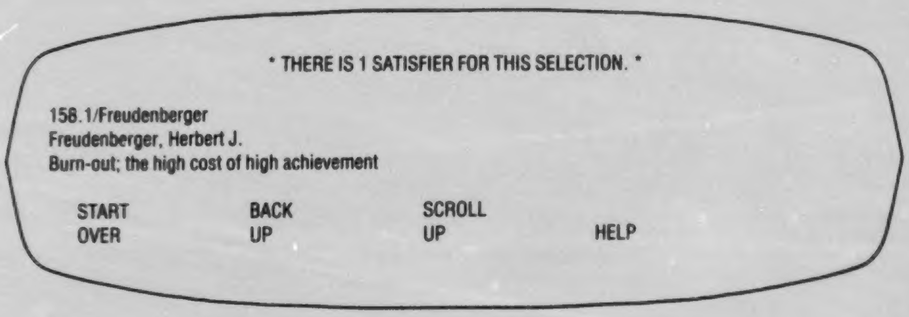
DISPLAY ALL - Touch to fill in all the entries between the "FROM:" and "TO:" on the screen.

HELP - Touch to receive additional instructions during your search.

Or, ask your librarian for assistance.

Now touch "RETURN" to return to where you were.

Help screen is displayed. User touches "RETURN" and previous screen is displayed. User touches "Burn-Out; etc."

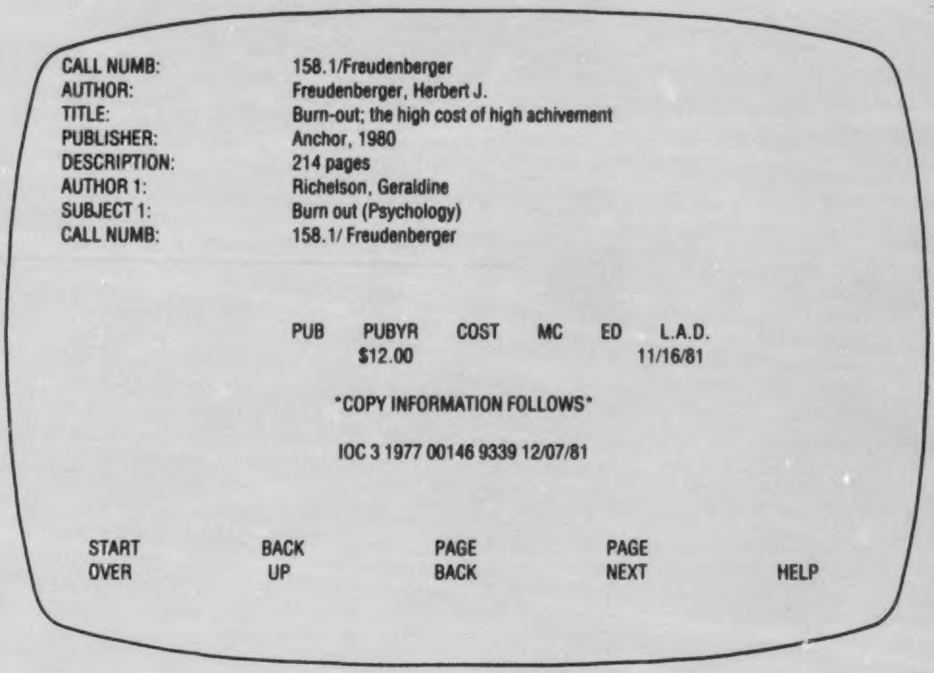


* THERE IS 1 SATISFIER FOR THIS SELECTION. *

158.1/Freudenberger
Freudenberger, Herbert J.
Burn-out; the high cost of high achievement

Brief record is displayed.

EXHIBIT 12 (continued)



CALL NUMB: 158.1/Freudenberger
AUTHOR: Freudenberger, Herbert J.
TITLE: Burn-out; the high cost of high achivement
PUBLISHER: Anchor, 1980
DESCRIPTION: 214 pages
AUTHOR 1: Richelson, Geraldine
SUBJECT 1: Burn out (Psychology)
CALL NUMB: 158.1/ Freudenberger

PUB	PUBYR	COST	MC	ED	L.A.D.
	$12.00				11/16/81

COPY INFORMATION FOLLOWS

IOC 3 1977 00146 9339 12/07/81

Full record and copy level display.

EXHIBIT 12 (continued)

Pikes Peak Library District

The Pikes Peak Library District, located in Colorado Springs, CO., has about 100,000 registered borrowers.

The Pikes Peak Library developed its own automated library system, called Maggie's Place, and uses a Digital Equipment Corporation manufactured PDP 11/70 and a second PDP 11/44 minicomputer. The application software is programmed in BASIC PLUS/II. Maggie's Place provides the patron with access to the online catalog and to the circulation system database. In addition, the system provides acquisitions and acquisitions accounting, access to community databases, decision support system, budget system, carpools, furniture equipment inventory, payroll, and an electronic mail system. The system has a total of 88 terminals linked to the computer system and of these, 13 terminals at the main library are for online patron access catalog use. The locations of the computer catalog terminals in the main library are shown in EXHIBIT 13. In addition 6 dial-in ports are available for approximately 450 home users who their own personal microcomputer or a terminal with a modem.

The computer database contains information about approximately 240,000 unique titles and approximately 356,000 copies. The computer system provides the user of the online catalog with access to author, title, subject headings, and call number searching capabilities. Explicit boolean and keyword or term

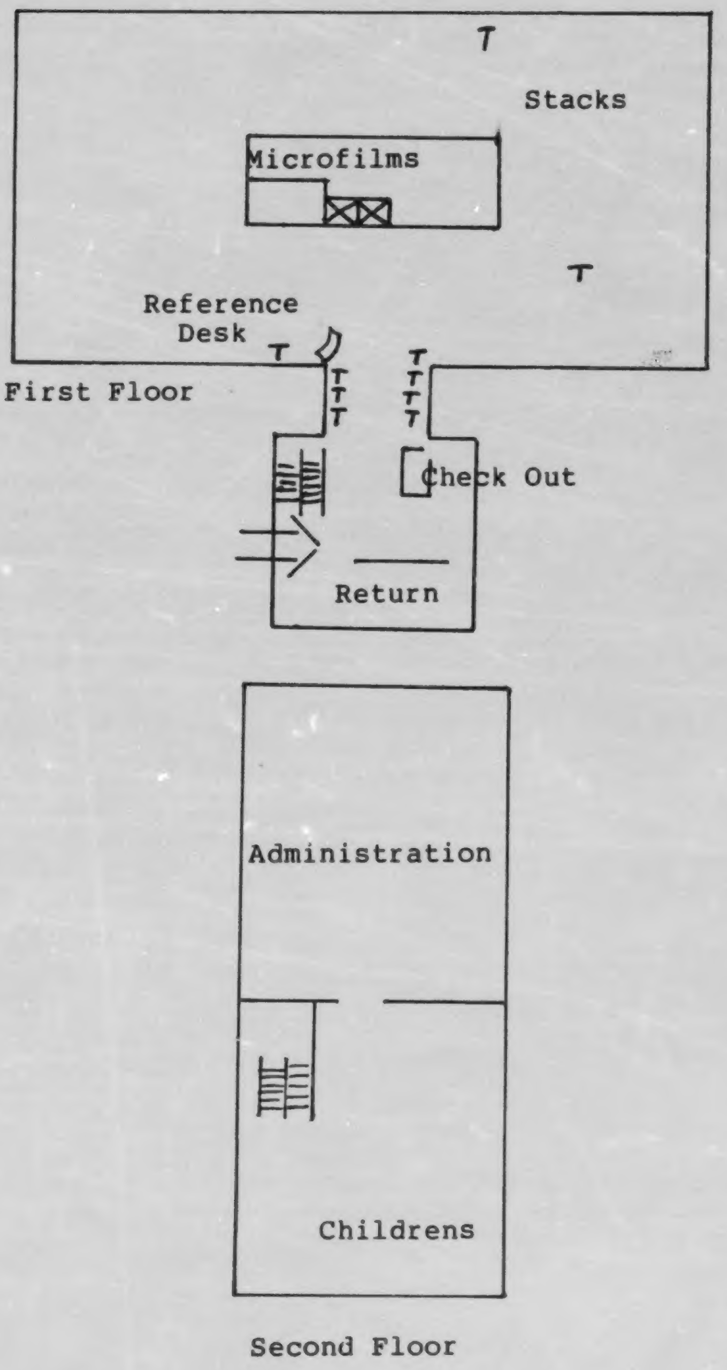
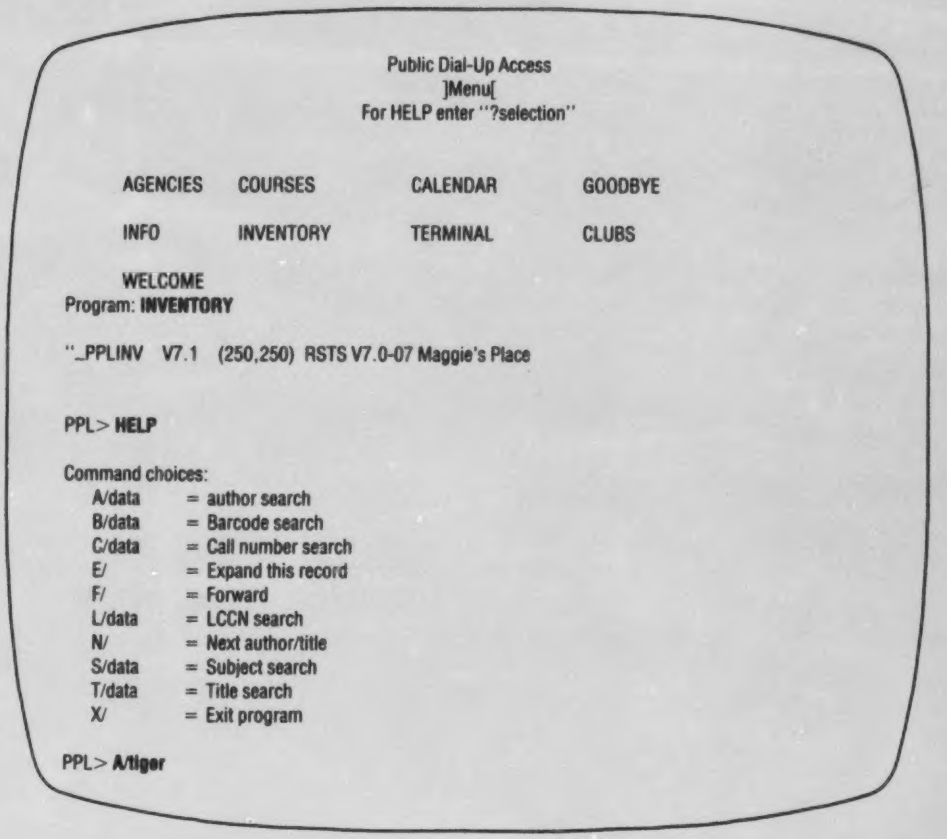

Stacks
Microfilms
Reference
Desk
T
First Floor
Check Out
Return
Administration
Childrens
Second Floor

EXHIBIT 13: Online Catalog Terminal Locations at the Pikes Peak Library

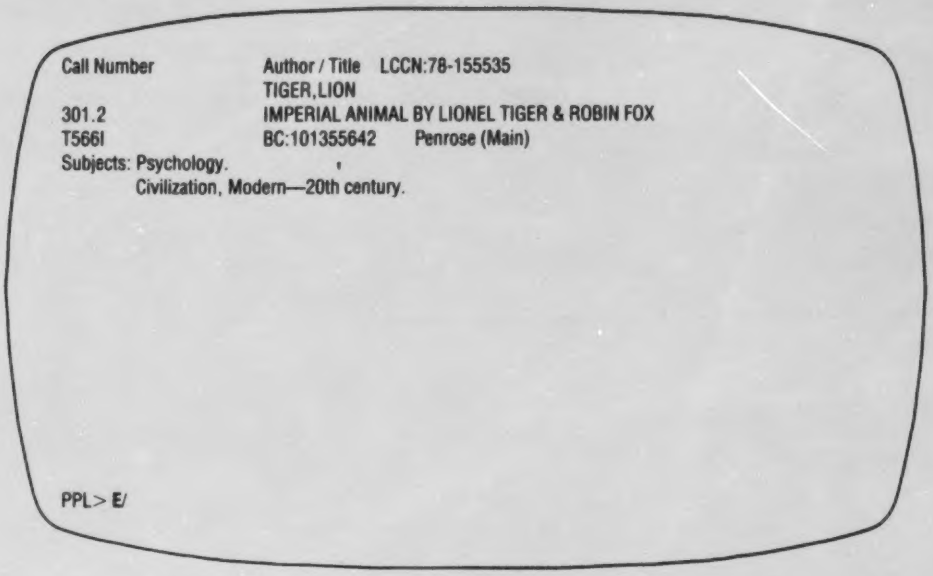
searching capability are not available. EXHIBIT 14 provides some sample screens for the Pikes Peak system. The online catalog became available for public use in June 1981.



```
                        Public Dial-Up Access
                               ]Menu[
                     For HELP enter "?selection"


    AGENCIES    COURSES        CALENDAR       GOODBYE

    INFO        INVENTORY      TERMINAL       CLUBS

    WELCOME
Program: INVENTORY

"_PPLINV   V7.1   (250,250)  RSTS V7.0-07 Maggie's Place


PPL> HELP

Command choices:
    A/data      = author search
    B/data      = Barcode search
    C/data      = Call number search
    E/          = Expand this record
    F/          = Forward
    L/data      = LCCN search
    N/          = Next author/title
    S/data      = Subject search
    T/data      = Title search
    X/          = Exit program

PPL> A/tiger
```

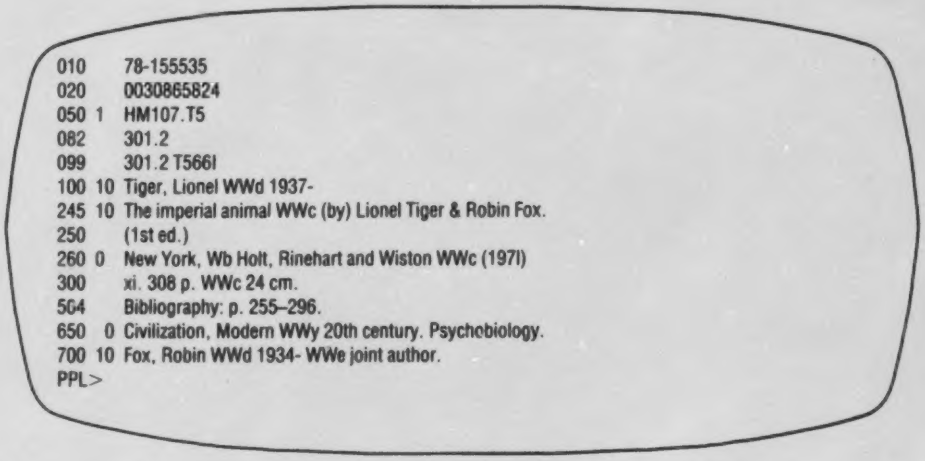
Initial display screen, user asks for "HELP" and then enters an author search.

EXHIBIT 14: Sample screens for the Pikes Peak Library System (Maggie's Place).



```
Call Number          Author / Title   LCCN:78-155535
                     TIGER,LION
301.2                IMPERIAL ANIMAL BY LIONEL TIGER & ROBIN FOX
T566l                BC:101355642      Penrose (Main)
Subjects: Psychology.
          Civilization, Modern—20th century.







PPL> E/
```

System provides a short record display and user asks for an expanded or full bibliographic record.



```
010     78-155535
020     0030865824
050 1   HM107.T5
082     301.2
099     301.2 T566l
100 10  Tiger, Lionel WWd 1937-
245 10  The imperial animal WWc (by) Lionel Tiger & Robin Fox.
250     (1st ed.)
260 0   New York, Wb Holt, Rinehart and Wiston WWc (197l)
300     xi. 308 p. WWc 24 cm.
504     Bibliography: p. 255–296.
650  0  Civilization, Modern WWy 20th century. Psychobiology.
700 10  Fox, Robin WWd 1934- WWe joint author.
PPL>
```

System provides full record.

EXHIBIT 14 (continued)

Section III

SURVEY RESPONDENT CHARACTERISTICS

The response rates for both the user and non-user surveys averaged 46.5 percent and 62.2 percent, respectively (see EXHIBIT 15). The response rates for completed user questionnaires ranged from a high of 72.4 percent at Stephen F. Austin State University to a low of 29.4 percent at Mission/West Valley Community College's. In all, the questionnaire response rates were quite good. While each library will be specifically mentioned in the following sections, it should be remembered that the small sample size of the Claremont Colleges requires considerable care in making generalizations or comparisons between systems.

The user questionnaire, with a total of 59 questions, was relatively long and took 15-20 minutes to complete. Clearly Part II, "Your Experience with Computer Catalog Features," required some patience and persistence on the part of the respondent and, as shown in EXHIBIT 15, there were some respondents who skipped some questions in this Part--question sample size ranges from 861 to 1,113 out of a possible 1,152. Yet, the response rate improved considerably for the following two Parts. Thus, while the length of the user questionnaire might have introduced some bias due to declining sample size for the later questions, this did not in fact occur.

The response rate for each item in the non-user questionnaire was

EXHIBIT 15: Questionnaire Response Rate

	User Questionnaire			Non-User Questionnaire		
	Approached	Completed	Percent Completed %	Approached	Completed	Percent Completed %
Claremont Colleges	101	49	47.5	84	54	64.1
Mankato State University	400	281	70.5	380	240	63.1
Stephen F. Austin State University	388	111	72.4	259	160	61.7
Mission/West Valley Community Colleges	527	155	29.4	305	228	74.7
Evanston Public	382	252	65.9	423	254	60.1
Pikes Peak Public	677	304	44.9	662	379	57.2
Total	2,475	1,152	46.5	2,113	1,315	62.2

Sample Size

User Questionnaires	High	Low
Part I (10 questions)	1,147	1,136
Part II (31 questions)	1,113	861
Part III (12 questions)	1,124	1,055
Part IV (12 questions)	1,128	1,117
Non-User Questionnaires		
Part I (6 questions)	1,315	1,249
Part II (9 questions)	1,309	1,293

uniformily quite high. This was no doubt due to the brief nature of the instrument. All completed questionnaires, even if some questions were skipped, were included in the data analysis.

Due to the thorough preparation in developing the data collection instruments, libraries installing public access online catalogs may wish to consider using the same questionnaires used in this study.

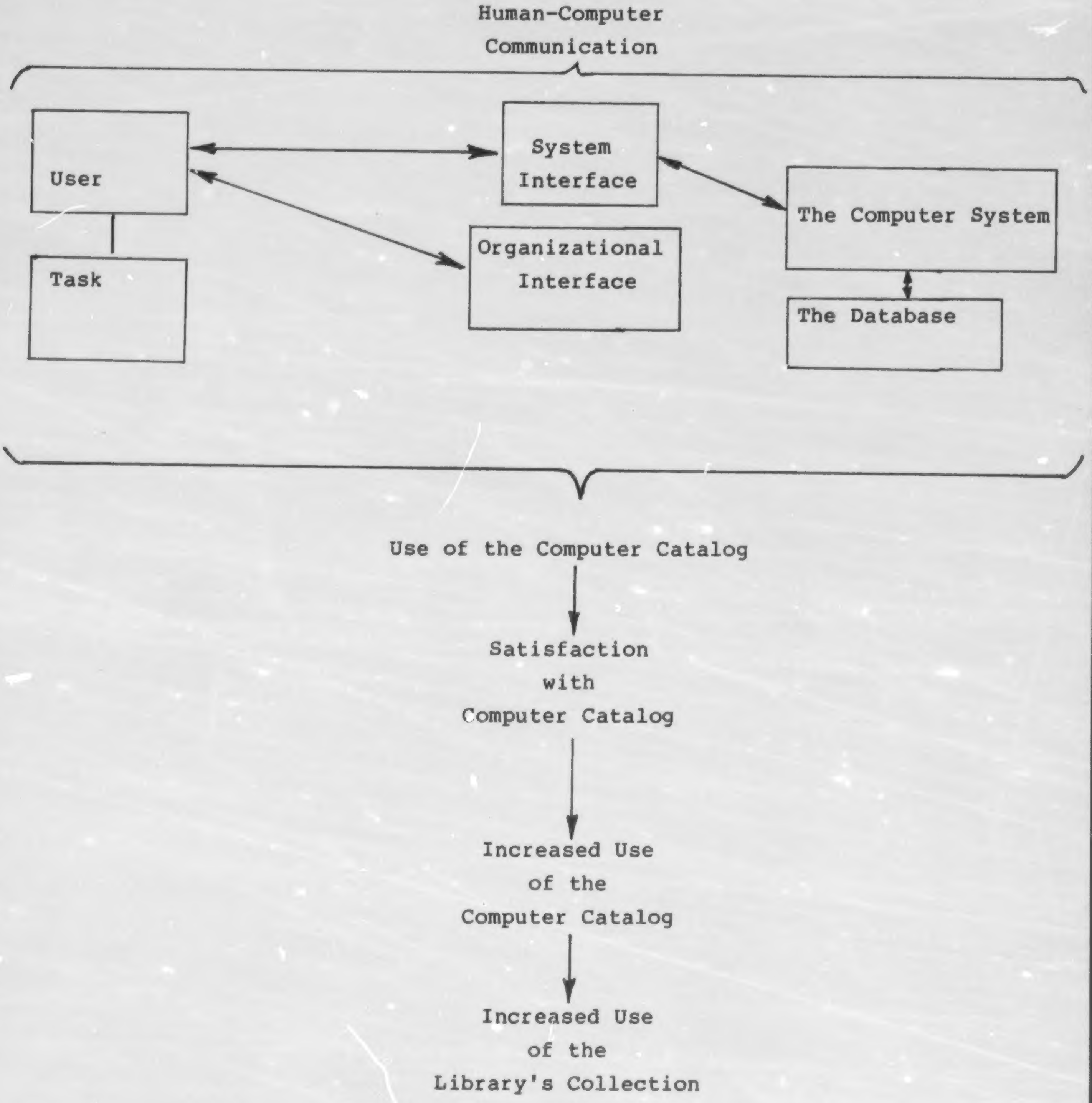
Section IV

COMPONENTS OF THE ONLINE CATALOG

While it is possible to identify a great number of variables or factors that comprise an online catalog, in general it is advisable to group these various factors into six broad components. These components, shown in graphic form in EXHIBIT 16, include: The user, the task, the organizational interface (the library), the computer system, the database, and the human-computer interface.

In a typical scenario, an individual at the online catalog terminal, the user, is using the online catalog to answer one or more questions, the task. The user searches the computer catalog (the database) using a terminal linked to the computer system. The human-computer interface is the locus of the interactive communication--using a specific "language or protocol"--between the catalog user and the computer system. The user makes known his/her information request to the computer and the computer responds. Based on this response the user takes further action. The human-computer interface includes commands, displays, messages, and a means to access the online catalog database through indexes stored in the computer system. The organizational interface, typically a library, provides terminals, furniture and lighting, staff assistance, and printed aids for training and orientation of the user.

EXHIBIT 16: Components of the Online Catalog


Human-Computer
Communication
User
Task
System Interface
Organizational Interface
The Computer System
The Database
Use of the Computer Catalog
Satisfaction with Computer Catalog
Increased Use of the Computer Catalog
Increased Use of the Library's Collection

Presumably, the user will be able to use an online catalog directly with little or no instructional or staff assistance. It is assumed that the majority of users are naive or novices when it comes to computer technology in general and the online catalog in particular. The majority of these novice users probably do not seek a deep understanding of the computer system and at the same time seek to minimize the necessary learning required to develop rudimentary skills at the online catalog. Yet, because of their very limited knowledge of computer systems, the majority of novice users are "at risk" in use of the online catalog. If the system responds with an unfamiliar display or if an input error leads to an unusual response from the computer system, the user may experience fustration and be less inclined to trust the computer system in the future.

The human-computer interface has to be both a link with the required facilities to allow a user to accomplish a set of tasks at the computer catalog and a barrier protecting the user from contacts with other technical (confusing) facets of the computer system (Stewart, 1974). An example of a computer message which has slipped through a "leaky" barrier, "ABEND at line 4376," illustrates the kind of surprise from which the naive (or even an experienced) user should be protected, especially if the computer provides no suggestions on how to resolve the problem and proceed with the search. An analogy will further illustrate this point. The automobile driver need not master the intricaticies of the internal combustion engine to be able to use a car safely. The attitude of the user, e.g., a rental car customer, is to say "give me the keys, a map, and make sure the gas tank is full and away I'll go."

A desirable objective for any online catalog is to create a human-computer interface that is "user-friendly" or "user-cordial" (Goldstein and Ford, 1978). The purpose of a user-cordial interface is to make the total interaction between the user and the computer system as easy and productive as possible. A user-cordial interface will reduce or compensate for common human errors.

It is anticipated that ease of use of the online catalog and accessibility of the library's database, all at the fingertips of a catalog user, will increase the user's satisfaction with the catalog as a finding tool for the collection. This increased patron satisfaction will, it is expected, lead to increased use of the catalog as reflected in the types and volumes of search activity. The success rate, i.e., number of times users find what they are looking for, might be similarly improved over that experienced by a user of a card catalog. Thus, use of a online catalog will likely be higher overall than use of a card or COM catalog.

As use of the catalog increases, use of the collection may likely correspondingly increase. This increased use of the library's collection may likely be reflected in higher circulation and in-library use figures.

The next several sections of this report will explore in detail each of the components of the online catalog.

Section V

THE USER OF THE ONLINE CATALOG

The user is one of the most important components of the jigsaw puzzle called an online catalog. The user is important as a "given" in any computer system design because there is little that can be done to change or alter the user's approach to problem solving or filling an information need. The user's potential access paths/approaches must be identified and understood by both librarians and by the designers of computer catalogs. The majority of users will not be interested in learning a great deal about the inner workings of a library's catalog or computer system. Yet if the objective of providing an online catalog that can be easily used by almost all library patrons, especially naive patrons, is to be realized, then the essential "unchangeableness" of the user must become the primary piece of the puzzle around which the rest of the components are fitted to complete the online catalog picture.

Based on the results of the survey, users of the computer catalog visit the library on a fairly frequent basis. Slightly more than 40% of the users come to the library on a weekly basis and more than two-thirds of the users arrive either weekly or daily (see EXHIBIT 17).

EXHIBIT 17: Frequency of Library and Catalog Use for Users of the Online Catalog

	JMA Aggregate	Claremont Colleges	Mankato State	Stephen F. Austin	Mission/ West Valley	Evanston Public	Pikes Peak
	%	%	%	%	%	%	%
I come to this library:							
Weekly	45	43	53	55	47	48	31
Monthly	25	18	10	10	18	37	40
Daily	17	27	31	30	30	2	5
I use the Library's Book, Card or COM Catalog:							
Occasionally	37	31	39	41	33	43	30
Rarely	26	33	39	23	27	18	18
Most visits	17	17	9	74	8	21	24
Not before today	12	19	12	7	27	10	8
I use this computer catalog:							
Most visits	38	41	43	52	35	39	29
Occasionally	27	41	36	29	40	18	17
Every visit	25	4	17	13	18	35	38
I use another computer system							
Never	39	22	43	49	45	29	38
Weekly	16	25	16	13	14	21	10
Daily	14	20	5	6	17	16	20
Monthly	13	20	10	10	13	14	14

Computer catalog users make only modest use of the library's book, card or COM catalog. About one-third of the respondents use the non-computer catalog "occasionally" and about one-half (55%) either occasionally or on "most visits" (see EXHIBIT 17). Prior card catalog use studies suggest that the user is likely to use the catalog about half the time (Maltby, 1973; MacLean, 1972). Use of the computer catalog is considerably higher. Almost two-thirds of the respondents (64%) use the computer catalog either "most visits" or "occasionally" (see EXHIBIT 17). An additional 20.7 percent of the users find themselves at a computer catalog terminal "every visit" to the library.

There are a number of possible explanations for this higher use of the computer catalog. The majority of users of the computer catalog might be devotees of computers in general. Yet, interestingly, slightly more than one-third of the users of the computer catalog indicate that they never use another computer system. And so, for a fair number of users of the computer catalog, familiarity with and prior use of computer technology are not prerequisites for using the computer catalog. Another one-third of the users, however, are fairly active users of other computer systems (see EXHIBIT 17).

The novelty of the computer catalog may also be attracting people to "play with the new toy in the library." While not as exciting as the majority of the video games in an arcade, an interactive online catalog is perhaps a bit more entertaining than the card catalog. And the library's computer catalog does not require quarters to "play." Dale Carrison, Dean of the Library at Mankato State University, has noted that when a library first goes "online" to the MSUS/PALS system, the number of transactions is highest during the first few months of use and then drops off slightly. This suggests that novelty is initially a factor in the use of an online catalog.

Given that five of the seven libraries in the study are academic libraries, the profile of the typical user is almost predictable (see EXHIBIT 18). The typical user of the online catalog is male (57.7% of the users surveyed were male). Almost 40% of the respondents are between the ages of 20-24 years; an additional 25% are between the ages of 15-19 years. Thus, the majority of online catalog users are young adults. The educational level of users is quite high--over 80% have completed some college or are college graduates.

Interesting differences between the aggregate JMA averages and individual libraries are noted for the Claremont Colleges Libraries and the two public libraries. Since the online catalog

EXHIBIT 18: Characteristics of Users of the Online Catalog

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
Male	58	88	52	46	66	54	61
Female	42	12	48	54	34	46	39
Age group:							
20-24 years	38	49	61	61	45	20	18
15-19 years	25	43	19	29	33	25	21
25-34 years	19	2	18	6	16	20	27
35-44 years	9	4	1	2	4	13	20
14 and under	3	0	0	1	0	11	3
45-54 years	3	2	1	1	3	5	6
55-64 years	1	0	0	0	1	4	1
65+ years	1	0	0	0	0	2	3
Current or highest grade completed:							
Some college	51	90	78	91	79	28	34
College graduate	26	10	20	8	17	43	37
High school	15	0	0	1	6	24	28
Class level							
Freshman-Sophomore	51	53	33	51	83	NA	NA
Junior-Senior	37	37	53	41	7	NA	NA
Graduate-Master level	7	0	13	4	1	NA	NA
Academic area							
Business Management	24	4	27	24	26	NA	NA
Arts and Humanities	16	6	18	20	11	NA	NA
Social Science	12	2	18	11	4	NA	NA
Physical-Biological Sciences	11	39	6	17	6	NA	NA
Engineering	11	45	2	5	20	NA	NA
Main focus of academic work:*							
Course work	84	92	81	78	88	NA	NA
Research	28	14	33	26	26	NA	NA
Teaching	5	2	7	6	3	NA	NA

* Multiple responses possible; therefore totals may be larger than 100%
NA = Not Applicable

terminals are located in the Science libraries at the Claremont Colleges Libraries, the large number of male respondents is perhaps not surprising. There are more older users at the Pikes Peak Library and, while the educational levels in the public libraries is not as high as the total JMA group, a large number of users of the Evanston Public Library are college graduates.

Within the academic libraries, about half the users are in the freshman-sophomore class and slightly more than 88% of the users are undergraduates. An overwhelming number of users are approaching the online catalog to meet the needs of course related work (83.5%). Similar results were reported in prior card catalog use studies (Palmer, 1972; and Lipetz, 1970). The research needs of an individual concern approximately one-fourth of the users of the computer catalog.

Analysis of the academic areas of users suggests that the online catalog is being used by all segments of the college and university. The Business-Management area accounts for almost one-fourth of the users. This is followed by the Arts and Humanities (15.5%), Social Sciences, Physical-Biological Sciences, and Engineering (see EXHIBIT 18).

The User's Task

The user comes to the computer catalog for different purposes and often with incomplete or inaccurate information. Personal characteristics of the user affecting the success of using the catalog include the amount of training and experience in using the catalog and, perhaps more importantly, the perseverance and intelligence of the searcher. While some of the individual characteristics of the user can be influenced to some degree through training and online assistance, e.g., help screens and prompts, a considerable amount of what the user brings to the online catalog experience is unchangeable from the perspective of system designers and librarians. Understanding more about the information seeking behavior of users and non-users is crucial in order to design an online catalog that truly complements the search strategies of information seekers. More will be said about how the user learns to use the online catalog in Section VI.

Some 6 out of 10 users (61.7%) of the computer catalog are trying to "find books, journals or magazines on a topic or subject." This would seem to suggest that users are arriving at the computer catalog with an expectation to do more subject searches than has been possible with "alphabetical" forms of the catalog. Prior card catalog studies have suggested that known item searches and subject searches occur about equally, although the proportion of known item searches is considerably higher in academic libraries.

In addition, almost half of the searches reported by users were for a specific book--45.8% (a known item search). An additional 20% of the users were looking for books by a specific author--very definitely a known item search (see EXHIBIT 19).

As found in prior card catalog use studies, the user's primary purpose for using the catalog was to complete a course paper or report--a class assignment (43.4% of the users). Class or course reading was the reason given for use by an additional one-third of the respondents. Clearly the type of library influences this result. The online catalogs in academic libraries are used by students primarily for course related activities. In public libraries the majority of users (slightly more than 75%) want the information contained in the catalog primarily for personal interest or recreational uses as shown in EXHIBIT 19.

According to prior card catalog studies, few people ever remember complete bibliographic data. And if people arrive at the catalog with written information it is only slightly more likely to be correct than if the information was memorized. In sum, the bibliographic information brought to the catalog is likely to be partially complete and/or incorrect (American Library Association, 1958; and Taglizcozzo *et al*, 1970). Yet a large number of users of the online catalog report that they know a complete subject heading (52.0%), a complete title (36.1%) and a complete author

EXHIBIT 19: Information Search Task

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
I was trying to find*							
Books on a topic	62	59	74	76	64	47	51
Specific book	46	51	36	36	43	57	50
Books by a specific author	21	20	15	16	20	27	23
If book is available	17	12	10	7	18	23	22
I need this information:*							
Course paper or report	43	49	62	59	57	27	26
Class or course reading	34	39	46	39	57	20	21
Personal interest	34	33	22	15	25	46	47
Recreational uses	20	16	9	7	14	31	31
Work or job	12	18	8	4	5	17	18
A hobby	11	4	4	4	8	13	20
I come with:*							
Subject heading	52	53	47	64	67	41	54
Complete title	36	35	24	31	34	47	42
Complete Author	35	41	22	30	32	51	35
Topic word or words	34	14	63	34	24	19	27
Part of an author's name	9	12	6	7	11	12	10
Part of a title	9	16	8	10	10	7	11

* Multiple responses possible, therefore totals may be larger than 100%

(34.5%) as shown in EXHIBIT 19. The number of users arriving with either a subject heading or a topic word or words is considerable (89.7%). However, it was not possible to ascertain the accuracy of the patron's perception of bringing complete information to the catalog.

Non-Users

Compared to users of the computer catalog, non-users visit the library only slightly less frequently than users. Slightly more than one-third (35.4%) come weekly, and an additional one-fifth arrive daily or monthly as shown in EXHIBIT 20.

Non-users of the computer catalog consult the library's existing card, book or COM catalog slightly less often than users of the online catalog.

Non-users of the online catalog may have had little prior contact with computer technology in general and thus be disinclined to use the computer catalog in the library. As shown in EXHIBIT 20 for non-users and EXHIBIT 17 for users, non-users have had much less use of another computer system when compared to users of the online catalog.

Unlike users, the non-user sample population was almost evenly split between female (51.7%) and male (48.3%) as documented in

EXHIBIT 20: Frequency of Library and Catalog Use for Non-Users of the Online Catalog

	JMA Aggregate	Claremont Colleges	Mankato State	Stephen F. Austin	Mission/ West Valley	Evanston Public	Pikes Peak
	%	%	%	%	%	%	%
I come to this library:							
Weekly	35	39	43	42	40	33	26
Daily	22	24	37	29	46	8	3
Monthly	20	2	13	15	8	31	29
Four Times a year	12	9	4	8	1	15	25
I use the Library's Book, Card or COM Catalog:							
Occasionally	30	29	38	36	13	35	27
Rarely	26	21	38	32	36	17	17
Not before today	22	42	12	9	49	17	18
Most visits	14	8	10	18	1	20	18
Every visit	9	0	2	5	1	11	20
I use another computer system							
Never	59	32	44	67	76	55	63
Weekly	10	19	11	8	9	14	7
Monthly	8	11	14	8	4	8	6
Daily	8	17	3	6	6	11	9

EXHIBIT 21. In terms of age, the majority of the non-users are between the ages of 20-34, which is slightly older than the ages of the user sample. Non-users have greater senior citizen representation, especially from the public libraries.

Academic library non-users of the online catalog have about the same distributions as users in terms of grade level e.g., freshman-sophomore, and the primary focus of academic work, i.e., course work. However, as shown in EXHIBIT 21, more non-users of the online catalog come from the following disciplines: Engineering, Undeclared major, and Education.

Non-users of the computer catalog report that the reasons for non-use include: 1) have not taken the training (44.5%); 2) no need to use any library catalog (44.0%); and 3) no time to learn to use the online catalog (41.9%). Further, while one-fourth reported they are a visitor or an infrequent user of the library, another one-fourth reported they did not know there was a computer catalog and some 14 percent claimed they did not know where the online catalog was located. 17 percent felt that the card catalog was easier to use (see EXHIBIT 22).

Yet, despite the fairly widespread belief that training was required to learn to use the online catalog, 78.9 percent anticipated that it would be somewhat or very easy to learn to use the computer catalog. This belief in an "easy to learn" computer

EXHIBIT 21: Characteristics of Non-Users

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
Female	52	39	49	53	50	58	52
Male	48	61	51	47	50	42	48
Age group:							
20-24 years	37	39	62	50	52	20	17
25-34 years	20	4	12	9	15	24	31
15-19 years	19	41	21	33	21	11	11
35-44 years	10	6	4	4	6	12	18
45-54 years	6	6	1	3	4	9	10
65+ years	4	4	0	0	8	13	33
55-64 years	4	2	0	0	1	8	7
Current or highest grade completed:							
Some college	60	65	80	83	82	32	41
College graduate	28	26	16	14	11	53	35
High school	12	9	3	4	0	13	23
Class level							
Freshman-Sophomore	53	34	33	53	78	NA	NA
Junior-Senior	32	36	54	34	5	NA	NA
Graduate-Master level	4	4	6	4	1	NA	NA
Academic area							
Business-Management	31	2	49	30	26	NA	NA
Engineering	13	36	3	6	23	NA	NA
Physical-Biological Sciences	11	30	7	17	6	NA	NA
Undeclared Major	9	0	6	7	15	NA	NA
Education	9	4	9	15	6	NA	NA
Arts and Humanities	9	10	8	12	7	NA	NA
Main focus of academic work:*							
Course work	86	84	86	83	90	NA	NA
Research	17	18	14	17	20	NA	NA
Teaching	5	4	9	8	0	NA	NA

* Multiple responses possible; therefore totals may be larger than 100%
NA = Not Applicable

EXHIBIT 22: Non-User Attitudes

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
Haven't used the computer catalog:*							
Have not taken training	45	41	50	53	38	38	46
No need to use any library catalog	44	45	53	43	62	31	24
No time to learn how to use	42	31	50	45	31	43	43
Visitor, infrequent user of library	29	53	23	16	14	41	36
Did not know there was a computer catalog	27	26	31	14	16	31	38
Card Catalog easier	17	12	17	17	11	22	18
Did not know where it is	14	14	13	9	9	13	19
Ease of learning to use the computer catalog:							
Somewhat easy	44	33	55	46	49	40	41
Very easy	35	54	24	24	30	43	40
Somewhat difficult	18	13	21	24	18	15	16
Very difficult	3	0	1	5	7	2	2
Time needed to learn to use computer catalog:							
0-15 minutes	37	45	28	20	32	50	44
15-30 minutes	26	23	28	25	34	20	24
30-1 hour	20	23	23	29	20	18	16
1 hour - half day	8	8	11	16	7	7	5
Day or more	5	0	6	6	5	4	7
Half day - a day	4	2	4	4	3	2	4

*Multiple responses possible, therefore totals may be larger than 100%.

EXHIBIT 22 continued

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
How likely to use computer catalog in future:							
Somewhat likely	43	37	46	52	45	43	38
Very likely	32	37	33	24	27	29	39
Somewhat unlikely	16	19	13	17	19	18	13
Very unlikely	9	7	7	7	9	10	10
General attitude toward computer catalog:							
Very favorable	43	54	36	36	50	45	44
Somewhat favorable	43	41	53	44	33	38	45
Somewhat unfavorable	11	6	9	16	11	13	9
Very unfavorable	4	0	2	4	6	4	3
Compared to the card, book, or microfiche catalog, this computer catalog is:							
Better	37	34	49	28	53	28	28
Equal	19	15	20	22	20	16	26
Worse	5	9	2	6	7	6	21
Can't decide	40	42	29	43	20	51	51

catalog is demonstrated by the expectation of 62.9 percent of the non-users that the time needed to learn to use the computer catalog is less than 30 minutes. Non-users have yet to use the online catalog, three-fourths expect to become users in the future, as shown in EXHIBIT 22.

To say that non-users have strong positive attitudes about the computer catalog is perhaps an understatement. 85.7 percent of the non-users rated the computer catalog as very or somewhat favorable. Non-users have strong positive feelings about the computer catalog and more than one-third rate the computer catalog as better than the card, book or COM catalog. However, more than one-third of the non-users (39.9%) can't decide as to what form of the catalog they do prefer (see EXHIBIT 22).

Summary Implications

The typical user is a young, well-educated adult who frequents the library on a fairly regular basis. Familiarity with and prior use of computer technology is not a dominant characteristic of the computer catalog user. Within the academic libraries, the user of the online catalog is attempting to meet the needs of course related work. Slightly over three-fourths of the public library users are at the computer catalog for personal interest or recreational uses. A similar profile emerged from prior card catalog use studies.

Users of the computer catalog expect to do more subject searches than they have performed in the past with card, book or COM catalogs. Users also feel that they bring complete information about a subject heading, title or author's name. Yet based on prior card catalog use studies, few people arrive at the catalog with complete or accurate bibliographic information. Given that over half the users arrive at the online catalog with a subject heading and one-third of the users with a topic word or words, the provision of term or keyword searching may be a mandatory requirement for a "successful" online catalog.

Until a great deal more research is completed about users of interactive computer-based systems, and the problem-solving skills resident in most people are better understood, designers of online catalogs must recognize the unchangableness of the user and provide several ways or methods for easily using and interacting with online catalogs.

Any online catalog marketing campaign should take advantage of the perceptions of non-users by emphasizing: 1) no formal training is necessary to learn to use the online catalog; 2) the improved information retrieval capabilities of the online catalog; 3) the location of the computer catalog terminals; and 4) the short period of time necessary to learn basic skills. Personal testimonials by influencial students, faculty, and community leaders would also be effective.

Section VI

THE ORGANIZATIONAL INTERFACE

The online catalog user typically comes to the library (although this need not be a requisite with a computer catalog) and is provided direct access to the online catalog. In addition to an online catalog terminal the library provides a complement of online catalog support services, e.g., staff assistance, printed aids, classes or video tape instructions on how to use the computer catalog, the physical setting (i.e., furniture, glare, lighting, temperature), and possibly printers. These support services are collectively labeled the "organizational interface" since these services, provided by the library, do have an effect on the ultimate success of the online catalog and influence the satisfaction experienced by the computer catalog user. The organizational interface has been described as everything from the edge of the terminal screen outward (Ferguson _et_ _al_, 1982). Everything from the edge of the screen inward is called the system interface or human-computer communications; this topic will be discussed in greater detail in Section VIII.

The majority of users (66.2%) first discover that the library has a computer catalog by simply observing the terminal in the library (see EXHIBIT 23). Given the "experimental" nature of these online catalogs, most of the libraries adopted a low "public relations" profile. About ten percent of the users hear about the computer

EXHIBIT 23: Learning to Use the Computer Catalog

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
Heard about the computer catalog:							
Noticed terminal in libary	66	84	43	49	62	86	65
Library course or orientation	10	2	22	22	13	0	3
Friend or family member	9	4	14	5	8	10	6
Library staff	6	8	6	11	6	2	7
Instructor	6	0	12	10	9	1	1
Learned how to use computer catalog:							
By printed instructions	54	63	47	60	46	35	77
By instructions on terminal	38	65	32	36	44	52	23
By library staff	25	12	26	46	40	17	19
By myself	23	14	22	12	23	32	24
From a friend	17	16	24	27	14	13	12
From a library course	10	0	25	15	16	0	1
I got help from:							
Terminal screen instructions	39	49	40	36	32	45	28
Printed matter, signs	38	37	34	38	52	17	63
Did not get help	32	33	39	32	24	41	20
Library staff member	17	8	15	17	31	12	17
Person nearby	6	4	3	8	7	5	7

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catalog either through a library course or orientation program (10.2%) or from a friend or family member (8.9%). The Evanston Public Library has found that children who learned about the library's computer catalog from a library orientation program during the week bring their parents to the library on Saturday to show them how to use the computer catalog. Library staff or a school instructor were sources of the news about the computer catalog for about five percent of the users.

The vast majority of users learn to use the computer catalog by themselves. Granted, the user consulted either the printed instructions provided by the library via brochures or signs (54.0%) or the instructions displayed on the computer catalog terminal screen (37.5%)--see EXHIBIT 23. An additional 23.3% report that they learned to use the system "by myself." The extent to which the user relied on printed instructions or instructions provided by the computer catalog is not known but in all likelihood these resources were probably tapped by the beginning user. However, about one-fourth of the users learned with the assistance of library staff members. This has potentially severe financial and staffing implications for libraries. One academic library, Ohio State University, has two paid students who act as computer catalog facilitators and instructors.

Interestingly, about one-third of the users required no help during their search--an encouraging sign. When the user did need help or assistance during the course of a search, the user turned most frequently to the computer catalog terminal (39.3%) or to the instructions found on printed materials - brochures or signs. Thus, as shown in EXHIBIT 23, there is a real need for the library to provide clear instructions on how initially to use the computer catalog and how satisfactorily to resolve problems encountered during a search. Instructions should accompany both printed materials and the online explanations provided on the terminal screen itself.

By and large the libraries included in this study are dealing with the organizational interface issues fairly effectively. While there are a few areas that need improvement, as will be seen shortly, the majority of issues, e.g., lighting, glare, terminals, training, signs, etc., have been satisfactorily addressed. For example, relatively few users, between 11% and 15%, are dissatisfied with the signs and brochures, staff advice or the availability of signs.

Initially there was some concern that the online catalog terminal, the physical link between the user and the computer system, would play a major role in the success of the online catalog. Yet, based on the survey results as seen in EXHIBIT 24, the terminal itself is presenting few problems.

The primary problem experienced by users of the online catalog in the seven libraries was the lack of sufficient writing space

EXHIBIT 24: Organizational Interface Problems

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
Computer Catalog Terminal:							
Writing space not sufficient	29	27	24	41	43	31	21
Printer is not easy to use	27	18	0	0	32	0	44
Nearby noise is distracting	11	4	10	27	15	7	10
Table height not right	8	6	10	6	11	5	8
Keyboard is confusing	8	10	3	10	10	NA	8
Lighting is too bright	6	2	3	2	8	8	6
Letters on screen not easy to read	6	10	6	10	4	3	5
Glare on screen	5	4	3	4	5	8	5

NA= Not Available

adjacent to the terminal. Slightly more than one-fourth of the users indicated difficulty in this area (the most difficulty was experienced at Mission/West Valley Colleges--43.0%, with a low of 20.7% of the users at the Pikes Peak Library citing this as a difficulty. This indicates the pervasive nature of this problem. Adequate writing space should be provided on both sides of the terminal and additional space should be allocated for the temporary storage of personal belongings, e.g., books, tablets, jacket, purse, etc. For the three libraries that provided printers for use in conjunction with the online catalog, Claremont, Mission/West Valley, and Pikes Peak, the user is having some difficulty in using the printer. To some extent users are reporting the fact that they didn't realize the printer was available rather than printer operational problems per se.

Other problems with the computer catalog terminal exist. The potential problems include nearby noise (from the terminal itself, the printer, and the library setting); the table height supporting the terminal might not be right; the terminal keyboard might be confusing; lighting could be too bright; the size of the characters displayed on the screen might not be easy to read; and there might be glare on the screen from a nearby major light source. Yet these potential problems are in aggregate relatively minor, with only 5-11 percent of the users reporting a problem (see EXHIBIT 24). The noise level in the library at the Stephen F. Austin State University Library does, however, distract about one-fourth of the users. Cakir _et al_ (1980) present the best summary of the environmental and ergonomic factors associated with the use of CRT terminals.

In terms of improvements to the organizational interface, users do have some definite suggestions. First, users would like access to more terminals (39.1 percent) both in locations outside the library (32.2 percent) and in other library locations (21.2%). Certainly the issue of the number and location of terminals is an important one since it translates into improved service levels for the library patron and into costs for the purchase and maintenance of the terminal for the library. Users at Mankato State University and Mission/West Valley Community College would definitely like additional terminals (see EXHIBIT 25).

The Pikes Peak Library computer system provides six dial-in ports to allow 450 users at home or at work with either a terminal and modem or a personal microcomputer to gain access to the library's database. The fact that more than one-fourth of the users at Pikes Peak (28.8 percent) expressed a desire for more terminals outside the library is therefore somewhat surprising. This result would suggest at least two possible explanations. First, the online catalog user is unaware of the dial-in access capability. And second, the user may be hoping that the library will provide, at the library's expense, additional terminals.

EXHIBIT 25: Organizational Interface Improvements

	JMA Aggregate	Claremont Colleges	Mankato State	Stephen F. Austin	Mission/ West Valley	Evanston Public	Pikes Peak
	%	%	%	%	%	%	%
Computer Catalog Service Improvements:*							
More terminals	39	22	48	33	56	24	40
Terminals outside library	32	22	49	41	27	18	29
Terminals in other library locations	21	35	19	10	26	19	25
Command chart posted	19	35	20	14	18	24	15
Manual at terminal	17	27	14	16	10	15	26
Training sessions	12	6	18	13	12	11	13
Audio-visual training session	12	8	14	5	12	8	16
Manual for purchase	6	4	6	5	6	4	8
None	27	27	19	30	22	43	23

* Multiple responses possible, therefore totals may be larger than 100%

OCLC received a grant from the National Science Foundation to investigate the number of terminals needed for a library's online catalog. A report from this project should be available by early 1983. Some libraries have gathered and analyzed queuing data in an effort to predict the number of terminals (Borgman and Kaske, 1980; Borgman and Kaske, 1981; Knox and Miller, 1980; and Sage _et al_, 1981). Others have suggested that there may be a correlation between the number of terminals and average daily attendance or average/peak circulation statistics. See Matthews (1982 B) for a further elaboration of this issue. While it is clear that there is a need for guidelines for estimating the required number of terminals, each library installing a computer catalog will no doubt have to experience a certain amount of trial and error before arriving at the "right" number and location of online catalog terminals.

The fact that the library can physically distribute the library's catalog (database) to multiple locations is one of the most attractive features of the online catalog. Library users need not come to the library or come to the main card catalog area to find needed information. Thus, access to the database is possible wherever a computer terminal is located--the library, teachers' offices, homes, senior citizen centers, shopping malls, etc. Convenient access to the information stored in the library's catalog, made possible by the combination of computer and telecommunication technology, creates the opportunity to provide library services in new and exciting ways, e.g., cable television.

Command charts and a manual or brochure assist the naive or inexperienced user in learning how to use the online catalog and aid the infrequent user who needs to "brush up" on online catalog skills. Almost one user out of five would like a command chart posted at the terminal and a manual or brochure near the terminal (see EXHIBIT 25). In particular, a command chart would be a helpful addition at Claremont and a manual or brochure is desired both at Claremont and Pikes Peak.

Interestingly, one-fourth of the users suggested that no organizational improvements are necessary; this is surprising given that online catalogs are really in an "infancy" stage of development. This would suggest that the libraries are aware of and have begun to meet their organizational interface obligations. Or, perhaps, users are delighted with the library services provided via the online catalog.

Summary Implications

Libraries with installed computer catalogs have done a relatively good job of addressing the organizational interface issues. The majority of users simply observe the terminal in the library and learn to use the computer catalog by themselves, using the printed instructions provided by the library via brochures or signs or the instructions displayed on the terminal screen itself. And when users need help, they turn most frequently to printed materials and by asking the computer catalog for "HELP." Thus, there is a real need for the library to provide clear instructions on how to use the computer catalog and how the user can solve problems encountered during a search. These instructions are needed in a printed form and should also be displayed on the terminal screen itself. In addition to brochures, a summary command chart affixed to the terminal is a feature frequently requested by users. The text layout or format for the presentation of this explanatory information should be different for the printed and video media.

However, nearly one-fourth of the users learned with the assistance of library staff members but users turned less frequently to staff when they encountered problems. Libraries with online catalogs must devise a coordinated program, perhaps using a slide tape or video tape program, to aid in assisting library patrons in learning to use the computer catalog. Libraries might wish to consider reserving a "learning" terminal for online tutorial use.

Libraries must address the issue of support furniture for online catalog terminals. To date terminals are typically placed on existing furniture with little thought of the needs of the user, e.g., privacy and comfort, or of the requirements of the terminal itself. The need for adequate writing space on both sides of the terminal is a prime consideration. Other factors for online catalog terminal furniture include temporary storage of personal belongings, provision for and masking of unsightly and potentially dangerous electrical and data cables, glare on the screen, and the need for a terminal "fence" at the rear of the terminal to improve the visual asthetics and discourage tampering with the switches and cables located at the rear of the terminal.

Providing dial-in ports to the computer to facilitate access to the library's catalog for users with terminals or personal (micro) computers is an encouraging development. However, these dial-in ports require additional CPU communications support equipment and the issues of patron confidentiality and system security must be addressed.

Section VII

THE COMPUTER SYSTEM

The computer system is the sine qua non for the online catalog. The principal components of the computer system are three: the terminal used by the user, the computer which handles the communications between the terminal and the database. In addition to the machine readable records representing the library's collection of materials, the database also contains indexes to these records in order to facilitate access by the user.

The Terminal

Currently there are two types of terminals that a user may encounter when using an online catalog. The first type of terminal is the standard cathode ray tube (CRT) or "TV screen" terminal with a keyboard which resembles that found on a typewriter. The CRT terminal displays both the data input by the user and any messages, prompts and screens returned to the user by the computer. The keyboard allows the user to enter a search request and send it to the computer. This CRT terminal with keyboard is used by all of the online catalog systems, with the exception of the public access terminal provided by CL Systems, Inc. The CLSI touch screen terminal, the second type of terminal, is a CRT terminal that does not have a keyboard. In addition to displaying information, it provides the user with choices or alternatives for further action. Users indicate their choice by pressing their finger on an indicated location directly on the screen of the visual display unit itself. Thus, the reference to "touch screen" terminals. It takes about seven touches for a user to retrieve and display an individual record.

Perhaps the two most important aspects of the CRT keyboard terminal are the keyboard used by the patron to input an information search request and the size of the characters displayed on the CRT screen itself. Keyboards come in a confusing array of configurations. The main portion of the majority of keyboards does resemble a typewriter keyboard, but there the similiarities cease. Some keyboards may have a separate numeric keypad to the right of the main group of keys, while other terminals may have a group of special function keys located above the main set of keys. Special function keys enable the user to initiate an entire series of related commands by pressing only one button. The special function keys may be labeled "F1," "F2," etc. as found on some terminals included in this study. It would be perhaps more helpful for a naive user if the special function keys were labeled "Author Search," "Title Search," etc. In addition, the RETURN key may be located at different places on the keyboard and may be labeled "SEND" rather than return.

The character displayed on the screen is created by energizing several dots or spots within a matrix of dots on the face of the

CRT screen. A minimum acceptable character size is a 7x9 dot matrix (Cakir _et al_, 1980). A larger 9x11 dot character is preferable since it produces a more natural character, i.e., a character more clearly resembling standard print. Of the six systems, only the CLSI touch screen terminal at the Evanston Public Library uses a 9x11 character, while the rest of the systems rely on a 7x9 dot character size.

The user questionnaire included two questions dealing specifically with the terminal itself (Question 43 A and 43 C). As shown in EXHIBIT 26, users have few problems with the letters on a CRT screen not being easy to read (only 5.8% of all users indicating a problem) or with the keyboard being confusing. The terminal used by Stephen F. Austin State University proved to be the most difficult for users to master with nearly one-fourth of the users (23.6%), citing this as a problem area. The larger 9x11 character size on the terminals at the Evanston Public Library was most pleasing to the users.

Based on this data it would appear that most users have few problems with the terminal itself.

The Computer

The computer system can be considered to be composed of two components: hardware and software. The hardware--or the computer equipment itself--is important because the choice of the size of

EXHIBIT 26: Terminal Problems

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
Terminal keyboard is confusing	8	10	3	24	10	NA	8
Letters on terminal screen are not easy to read	6	10	6	14	5	3	6

NA= Not applicable

the computer, i.e., mainframe computer or minicomputer, will directly influence the number of terminals that may be attached to the computer as well as the number of information retrieval features, e.g., Boolean searching, keyword or term searching, sorting retrieved records, etc., provided to users by the online catalog software. There are two main types of computer software or programs--operating system software and applications software. The operating system software handles the communications between the computer, the disk drives where the bibliographic records and indexes are stored, and the online catalog terminal used by the patron. But while the operating system routinely handles all the necessary computer housekeeping tasks, the applications software is much more important to the ultimate success of the online catalog. The applications software allows records to be added to the database, creates and maintains indexes or access points to the bibliographic records, and provides the necessary and appropriate terminal screen messages, prompts and information displays. It is this last function, i.e., the information displayed to the user and the human-computer communication protocol (or language) which allows the user to send a search request to the computer, that is typically called the "system interface." More will be said about the system interface in the next section of this report.

As shown in EXHIBIT 27, the characteristics of both the computer system and the online catalogs that run on each corresponding

EXHIBIT 27: Computer System and Online Catalog Characteristics

	Claremont Colleges	Mankato State	Stephen F. Austin	Mission/ West Valley	Evanston Public	Pikes Peak
Computer System Characteristics:						
Type of computer	Mini	Mainframe	Mini	Mini	Mini	Mini
Size of CPU	768K		192K	384K	128K	2,048K
Number of online catalog terminals	8	22	19	10	15	13
Command Language or menus	Menus	Command	Menus	Command	Menus	Command
Printer available	No	No	No	Yes	No	Yes
Online Catalog Characteristics:						
Status information provided	Yes	No	Yes	Yes	Yes	Yes
Single vs multiple library catalog	Single	Multiple	Single	Multiple	Single	Single
Number of access points (indexes) available to user[1]	6	11	10	10	3	8
Keyword or term searching	No	Yes	No	No	No	No
Boolean searching	No	Yes	No	No	No	No
Expand or limit results by date, language, publisher	[2]	Yes	No	No	No	No
Sort search results	No	Yes	No	No	No	No
Database Characteristics:						
Size of collection (titles)	[3]136,000	300,000	239,000	85,000	219,000	240,000
Total number of records in computer catalog	[3]69,000	232,000	100,000	79,000	219,000	240,000
Percent of collection in computer catalog	[3]51%	77%	36%	93%	[4]100%	100%
Number of registered borrowers	12,252	15,000	16,875	19,205	48,061	100,000

[1] A maximum of 14 access points under the direct control of the user was considered for the purposes of this comparison: author, title, author/title combination, subject headings, series, corporate author term or keyword, title term, subject term, call number, ISBN, ISSN, LCCN, document number, and local system number. Actual number of access points for a system is likely to be different.

[2] Subject search only (limit by date)

[3] Science libraries only

[4] Not all records are full records, i.e., some records may not have subject access. A recon project is in progress.

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computer system do vary considerably. Only the Minnesota State University System, developed at Mankato State, runs on a mainframe computer and this system alone offers keyword searching. Even with a mainframe computer, the user is limited to 8,000 matches for any one search.

Regardless of the size of computer system and its characteristics, two crucial issues pertaining to the computer catalog are system reliability and system response time. All of the systems experienced little or no downtime (periods when the computer is unavailable for use) during the data collection period. Response time, that interval of time while the user waits for the computer to process the search request, has been shown to affect the user's attitude about a computer (Miller, 1977). Response time is affected by the number of active terminals connected to the computer, time of day and day of week (busy periods), the type of transaction, and the amount of computer power available to process the user's search request. In particular, as response times increase beyond 10 seconds attitudes become negative. Interestingly, users are really concerned about consistency of response times--even during periods of heavy computer usage. Thus, system designers may wish to measure all transactions and "slow down" some responses during non-peak periods to provide consistent response times.

More than one-fourth of the users studied (29.6%) indicated a problem with computer system response times (see EXHIBIT 28). At Mankato State and Claremont, where almost all transactions are

EXHIBIT 28: Computer System Response Time

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
Rate of Computer Response too slow*	30	13	11	33	20	40	42

* Percent Agree or Strongly Agree

handled within 3-5 seconds, about 10% of the users still indicated a problem with response times. According to the users, response time seems to be a serious issue at Pikes Peak and the Evanston public libraries.

The Database

A machine-readable database is fundamental to an online catalog. Obviously if the data is not available in machine readable form then it is not accessible by the patron via the online catalog. As shown in EXHIBIT 27, the size of each library's collection and the amount of collection in machine readable form vary considerably. The database may contain brief or a full MARC records. In addition, the library may not yet have completed a retrospective conversion project. Access to the database is provided through a number of indexes or inverted files which in turn point or are linked to the appropriate bibliographic records. Again the number of indexes provided to the user varies from a high of 11 at Mankato State University to 3 at the Evanston Public Library.

The user of the online catalog would like the database expanded to include additional kinds of materials. Almost 4 out of 10 users indicated that they would like access to journal titles and about one-fourth of the users desired access to films, newspapers, government publications and phonograph records or tapes (see EXHIBIT 29). Surprisingly some 15 percent of the users felt the database required no additional coverage of materials in the library's collection.

EXHIBIT 29: Database Improvements*

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
Journal Titles	38	60	60	38	51	42	0
Motion picture films	26	17	24	24	24	31	24
Newspapers	23	13	39	27	30	25	0
Government Publications	22	17	28	11	19	20	24
Records or Tapes	21	17	10	17	22	30	26
Maps	17	13	14	16	13	17	24
More Older Books	16	17	14	38	17	24	0
Technical Reports	15	40	13	10	18	10	19
Music Scores	14	9	10	8	17	18	17
None	15	13	11	20	13	15	20

*Multiple responses possible so percentages do not total 100%.

Summary Implications

The terminals included in this study contributed few problems for users of the online catalog. A larger character size on the terminal screen will be more pleasing to the user but users are generally satisfied with the current 7x9 character size. Yet, substantial improvements can be made in the design of online catalog terminals. Keys with similar functions could be color coordinated and the special function keys could be precisely labeled, e.g., Author Search, Title Search, Subject Search, etc.

The size of the computer, i.e., mainframe or minicomputer, will clearly affect the features made available to the user of the online catalog. Only Mankato State University, with its mainframe computer, is able to provide keyword or term searching, explicit Boolean searching and sorting of the search results for each display. However, mainframe computers imply higher one-time and continuing costs for system acquisition and maintenance. The larger systems may also require a larger support staff.

The issues surrounding the database are complex and involve a number of trade offs. Should the database contain full MARC records? A full MARC record for all or some of the MARC formats, e.g., monographs serials, maps, etc.? How many indexes should provide access to the database? Should Boolean search capabilities be provided at all, or should they be explicitly or implicitly provided? Should there be term or keyword access to author, title, subject headings, added entries, notes or series data fields? Should a user be able to limit or restrict search results by date of publication, language, format of material, etc.? All of these issues and more must be faced by libraries considering on online catalog and by system designers.

Section VIII

THE SYSTEM INTERFACE

The information displayed to the user, plus the human-computer communication protocol or language provided to aid the user in sending a search request to the computer constitute what is typically called the "system interface."

The goal of any human-computer interface, most recently called "user friendly" or "user cordial" (Goldstein and Ford, 1978), is to make the user most productive while using the computer-based catalog system. The "friendliness" of a particular system or human-computer interface is much like beauty--"it's in the eyes of the beholder." Or, like Justice Potter Stewart's classic pornography definition, "I know it when I see it."

Exactly what constitutes a user-cordial system interface is still difficult to define but some progress has recently been made. Charles Hildreth, in a recent work supported by the Council on Library Resources, suggests that a user-oriented system interface is: 1) easy to use; 2) friendly and cordial; 3) protective and forgiving; 4) reliable and responsive; and 5) adaptive and flexible (Hildreth, 1982, pg. 59).

The longest portion of the user questionnaire, with 27 Likert-type (agree-disagree) attitude questions, was devoted to system interface-related issues. This section of the questionnaire asked about general types of searches as well as specific portions of the search itself. Respondents either "Agreeing" or "Strongly Agreeing" are grouped together to provide an indication of the problems experienced by users with a particular computer catalog feature. As shown in EXHIBIT 30, while a number of users have a significant problem with eight features of the computer catalog (more than 25% of the users indicated they experienced a problem with one or more of the eight features), the majority of users have very positive feelings overall about the online catalog. An additional 16 features were considered problematic by 10%-24.9% of the users.

While such a finding is indeed encouraging, especially given the early development phase of the online catalog, much work remains to be done to make all online catalogs truly "user friendly." It is surprising that more users did not encounter more problems with a greater number of the available computer catalog features. It is anticipated that the results of the CLR sponsored studies and the continuing feedback of the users to librarians and system designers will significantly reduce the number and intensity of problems experienced by future users of computer catalogs.

There are four functional areas which make up the user interface: 1) operation control; 2) search formulation control; 3) output

EXHIBIT 30: System Interface Problems

Rank	Issue	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
1	Increasing the result (Q 19)	42	32	38	48	28	44	51
2	Finding correct subject term (Q 17)	39	39	32	51	32	31	51
3	Knowing what is in computer catalog (Q 33)	36	36	39	60	36	25	32
4	Searching with truncation (Q 25)	31	17	24	41	27	NA	40
5	Entering commands when I want (Q 37)	28	34	23	55	16	30	27
6	Computer search by subject (Q 13)	28	26	17	22	15	32	43
7	Interrupting or stopping the display (Q 31)	25	7	31	28	29	19	27
8	Scanning through a long display (Q 18)	25	32	19	51	15	19	32
9	Using logical terms like AND, OR, NOT (Q 26)	22	NA	23	16	NA	NA	NA
10	Reducing the result (Q 20)	22	39	22	33	14	17	23
11	Typing in exact spelling, initials and spaces (Q 32)	21	26	21	23	21	NA	21
12	Selecting from a list of choices (Q 36)	19	9	15	53		21	13
13	Computer search by call number (Q 14)	19	5	NA	30	16	NA	18
14	Remembering exact sequence of commands (Q 27)	17	18	17	31	13	12	17
15	Remembering commands in the middle of the search (Q 16)	16	20	15	23	15	11	18
16	Using codes or abbreviations for searching (Q 22)	16	12	13	19	12	NA	19
17	Understanding the initial instructions on the screen (Q 28)	14	4	14	9	10	13	19
18	Understanding abbreviations on the screen (Q 23)	13	6	12	17	10	17	13

NA = Not applicable (system does not offer this feature).

EXHIBIT 30 (continued)

Rank	Issue	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
19	Combined author/title search (Q 15)	13	NA	12	20	4	NA	NA
20	Computer search by title (Q 11)	12	3	8	10	8	15	16
21	Understanding explanations on the screen (Q 21)	11	8	12	14	4	7	16
22	Understanding the display of multiple items (Q 30)	11	10	11	12	6	11	12
23	Computer search by author (Q 12)	10	2	8	5	8	10	17
24	Locating call number on the screen (Q 24)	10	14	8	9	6	9	15
25	The order in which items are displayed (Q 34)	10	6	7	11	8	9	14
26	Displayed messages too long (Q 35)	9	9	7	29	5	8	8
27	Understanding the display for a single item (Q 19)	7	6	7	9	4	6	7

NA = Not applicable (system does not offer this feature).

(display) control; and 4) support functions - information and instruction (Hildreth, 1982). It is interesting to note that the majority of software interface problems are concentrated in the areas of search formulation control and output (display) control.

Three out of the top five system interface problems reported pertain to the user's ability to retain control while using the online catalog. These three problems include how to increase the result when too little is retrieved (ranked #1 with 42.0% of the users indicating a problem), how to search with truncation (ranked #4 - 31.0%), and how to enter commands when I want (ranked #5 -27.9%).

As will be shown in Section IX, a significant amount of online catalog searches being conducted by users are subject searches. Yet, users are indicating that they continue to experience problems associated with subject searching. The second and sixth most frequently cited problems were "finding the correct subject term" (39.0% of the users indicated a problem) and "computer search by subject" (27.6%). It should be noted, however, that users are experiencing greater success with subject searching and in finding subject headings with the online catalog, based on the volume of subject searching, than with the card catalog. Users at the card catalog find valid subject headings about one-half the time (American Library Association, 1958; University of Chicago, 1968). Users of the computer catalog are successful about 61% of the time (User question number 17)--or a 10% improvement for users of the online catalog.

Such a modest improvement suggests that the Library of Congress Subject Headings (LCSH) contribute to the success of the user in finding "valid" terms. Much has been written about the limitations of LCSH and will not be repeated nor summarized here (Mandel, 1981; Cochrane and Kirtland, 1981). However, given the wide use of LCSH and its limitations, a specific course of action for improving the utility of LCSH in the online catalog environment is called for.

The online catalog has the potential for substantially increasing the number of access points available to the user; computer indexing allows the user to go beyond the first few words of a subject heading to component words or subdivisions though the use of term or keyword searching. Keyword or term searching increases the likelihood of a user's finding one or more subject headings or titles containing the user's "search term." Only one system of the six computer catalog systems examined in this study, the Minnesota State University System, provides the user with the capability to search by term or keywords. Yet the users at Mankato State experience about the same relative difficulties in finding the correct subject term (32.2% for Mankato and 39.0% for the total sample). However, Mankato State users experience fewer problems with subject searching (17.1% versus 27.6% for the total sample). Only the users at Mission/West Valley report fewer subject searching problems. A subject search at Mission/West

Valley provides the user with a display of valid subject headings which the user can browse and then examine records related to one or more subject headings. At the time of the study, users at Mankato State could no browse subject headings although they are now able to do so.

While more will be said about the improvements sought by the users of computer catalogs later in this section, it is important to note at this point that the first, second, fourth and sixth ranked improvements relate directly to subject or term searching (see EXHIBIT 31). Almost one-half of the users would like to be able to "view a list of related words" (45.3%). The ULISYS system at Mission/West Valley provides an authority control file capability but the authority control file currently contains few cross references. In addition, users indicated a desire to be able to "search the table of contents/index" (43.1%); "search by subject word" (31.0%), and "search by title word" (22.7%). There is considerable broad-based support for these improvements and, in the view of this author, the ability to browse the authority control file and the ability to use term or keyword searching ought to be mandatory requirements for any online catalog--whether located in an academic or public library. While it is true that keyword searching may add as much as fifty percent (50%) to the cost of disk data storage requirements, these costs are continuing to decline and when compared to the total system costs, the addition of keyword searching is likely to have only a minor

EXHIBIT 31: Additional System Features Desired by Users

Feature	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
View related words	45	61	51	40	47	35	47
Search table of contents/index	43	41	47	51	39	45	38
Determine if book checked out	36	41	60	17	18	42	25
Search by subject word	31	25	23	47	28	31	36
Print search results	26	29	21	37	28	27	26
Search by title word	23	25	16	29	19	25	27
Location of book in library	22	16	25	16	12	25	27
Step by step instructions	22	27	22	19	14	19	30
Search by illustrations & bibliography	17	6	20	11	18	20	15
Search by journal title abbreviation	14	27	20	12	12	10	11
Limit search by date of publication	13	14	18	16	9	12	9
Change display order	13	0	7	29	10	15	14

Multiple responses allowed so total may exceed 100%.

impact on total system costs. The issue of cost is an important consideration, as noted by Beckman (1982), but should only be one of several factors in deciding upon the capabilities of an online catalog.

The issues raised by the first ranked improvement--ability to view related words--are serious and have yet to be fully recognized either by system providers or by libraries. Two of the most important of these issues are: 1) what should be the source of the list of related words--read, "authority control file with SEE and SEE ALSO cross references," and 2) at what level, i.e., the local library, a regional consortium, a state or multi-state network, or a national bibliographic utility, should these authority control records be maintained? The answers to these questions are likely to vary for each individual library.

The second most sought improvement is the ability to search a book's table of contents and/or index. Such an ability implies that the online catalog provide term or keyword searching and that the bibliographic record augmented or enhanced to provide the additional information. Pauline Atherton, in her study of similarly augmented records (Books Are for Use, 1978), found that users were able to search faster, cheaper and with "greater degree of recall using the augmented record in comparison to a full MARC record." Clearly such an augmented record will require additional disk storage capacity but such storage costs continue to decline dramatically and so should not be a serious concern. However, the intellectual time necessary to select and input the additional terms from the index and/or table of contents will be quite expensive. In the not too distant future, automated data input machines will no doubt be able to read the table of contents and/or index of a work, select which phrases and terms should be indexed and automatically added to the MARC record to create an "Augmented MARC" (AUGMARC) record. The improved search resulting from such an augmented record may well be worth the costs involved. Use of an AUGMARC record is clearly an issue that deserves additional study and experimentation.

Computer System Interface Issues

Much as the list of features shown in EXHIBIT 31 will be helpful for system designers and librarians in making necessary improvements to the online catalog, a grouping of these features would likely provide even more guidance.

Using a statistical technique called factor analysis, which groups questions which are response-related (i.e., when this feature is reported as a problem, the other features in this group tend to be reported as a "problem" also), an interesting clustering of features emerges. As shown in EXHIBIT 32, the single most important group of features pertains to the use of codes or abbreviations. This area pertains both to the user's difficulty

EXHIBIT 32: System Interface Issues

	* Factor Weight
1 Codes or Abbreviations	
Understand abbreviations on screen (Q 23)	.719
Using codes or abbreviations for searching (Q 22)	.584
Understand explanations on screen (Q 21)	-.358
2 Display	
Understand initial instructions on screen (Q 28)	.512
Understand multiple record display (Q 30)	.496
Understand explanations on screen (Q 21)	.488
Find call number on screen (Q 24)	.369
Understand single record display (Q 29)	-.332
Remember sequence of commands (Q 27)	-.305
3 Management of Search Process	
Remember sequence of commands (Q 27)	.522
Remember commands in middle of search (Q 16)	.486
Scan long display (Q 18)	.419
Know what is in computer catalog (Q 33)	.410
Reduce the result (Q 20)	.358
Interrupt or stop display (Q31)	.337
Understand display order (Q 34)	.329
4 Subject Search	
Find correct subject term (Q 17)	.659
Subject search (Q 13)	.599
Increase the search result (Q 19)	.401
Search with Truncation (Q 25)	-.311
5 Other Search	
Title search (Q 11)	.506
Combined author/title search (Q 15)	.486
Author search (Q 12)	-.479
Call number search (Q 14)	-.455
6 Delays	
Select from a list of choices (Q 36)	.497
Displayed messages too long (Q 35)	.482
System response time (Q 38)	.408
Hard to find a free terminal (Q 42)	.312
7 Assistance	
Signs and brochures (Q 40)	.579
Signs and brochures available (Q 39)	-.389
Staff advice (Q41)	.343

*Positive numbers indicate a problem; negative numbers are positively phrased questions to which the user disagreed, thus indicating a problem.

in understanding abbreviations on the terminal screen and in using codes or abbreviations to conduct a search. It is helpful for the user if search abbreviations or codes are mnemonic; and are rule-derived, i.e., uniform and of fixed length.

The second most important area concerns the display of information on the terminal screen. Users have problems coping with and understanding initial displays, single record and multiple record displays, and finding a specific data element on the screen, e.g., the call number. This suggests that much remains to be learned about the display of bibliographic information on the screens of CRT terminals. The terminal itself offers some new ways in which information can be displayed and highlighted. For example, characters can be underlined, enlarged, blinked, made bold, and displayed on a reverse video background. Thus the technology offers a considerable amount of flexibility not possible with 3x5 cards. In addition, the increased amount of space -- typically 80 characters in width and a minimum of 24 lines -- offers the prospect for utilizing "white" or blank space. Data elements can be identified with words and not abbreviations. The layout or typography of the screens can be based on the frequency of use of data elements by patrons rather than the tradition of an older form of the catalog.

The third area concerns the user's management of the search process and specifically the feeling that the user is not in control of the search. Users report difficulty in remembering commands and when to use them, scanning a long display and understanding the display order, reducing the initial search result, or interrupting or stopping the display.

Users also report problems in attempting to conduct a subject search, especially in finding a correct subject term. Other types of searches are also problematical.

The delays users experience in using or attempting to use the computer catalog are a source of frustration. Extensive use of menus, long messages displayed on terminal screens, and poor system response time all contribute to this problem.

Summary Implications

The need for standards and consistency in the area of the display of information and use of codes or abbreviations on terminal screens is vital. For example, should bibliographic data elements be labeled? Where should the call number be located? Should the call number be a multi-line display similar to what is found on the spine of the item? Should system messages and options be presented at the bottom of the CRT screen? Should the previous command, used to generate the current display be included on the current display? Those involved in the standards setting process must remember that much of what worked with the 3x5 card technology will not work with CRT technology. As the number of computer catalogs proliferate and the number of separate computer catalogs multiply, this area becomes increasingly important. The time for action is now. Fortunately the work underway by an ANSI Z39 committee chaired by Pauline Cochrane is beginning to address this area.

The sole reason for the standards proposed here are that the user be spared the learning time and frustrations associated with learning to use and interpret the information displays as they use different online catalogs. Certainly there will be a cost associated with the adoption of these standards (Beckman, 1982) for those few libraries with operational computer catalogs but better that these costs be minimized. If libraries wait, then the costs will surely increase as the number of computer catalogs will only proliferate.

The display of bibliographic information on a CRT terminal screen is rarely undertaken from the perspective of the online catalog user. What data elements are needed for different types of displays? With what frequency do most patrons examine bibliographic data elements? What do a majority of patrons call each specific data element? The variations for displaying data on a CRT terminal screen are vast indeed. CRT terminals can display data in a number of ways: reverse video, brightness, blinking, size and underlined. However, it is important to prevent the tyranny of the constraints imposed by the 3"x5" card from spilling over and forcing their way, either intentionally or accidently, onto an 80 character by 24 line CRT terminal screen (which also imposes some limitations).

Users of computer catalogs need improved user cordial ways of retaining control and managing the information that they retrieve. Improvements are needed with the interface itself; standards are needed for a consistent and meaningful command language; and users must be trained in these new capabilities.

Given the amount of subject searching that is occurring with computer catalogs and the problems experienced by users with subject searching, this area commands serious attention at two levels. First, what are the short-term solutions that might be implemented by designers of the computer catalogs to improve subject searching? For example, systems might systematically "capture" terms entered by users to build a list of aliases (SEE References) to aid the user in moving from words entered by the user to LCSH terms. In addition, the Library of Congress might begin to assign more subject headings to each MARC record to improve the likelihood of a user finding valid subject headings. Second, what long-term steps might be taken by the library community to enhance subject searching at the public access computer catalogs?

The ability to view and browse an authority control file or an authority-based index is perhaps crucial to the success of the online catalog. The authority control file, given sufficient SEE and SEE ALSO cross references, can link the terms used by users to the pre-coordinate subject headings usually employed by libraries.

Keyword access for words contained in the corporate author, conference name, title, subject headings, notes and added entries combined with controlled vocabulary searching is a powerful tool. For example, a significant title word may retrieve a number of useful works but a look at the assigned subject headings and call numbers can lead to subject searches bringing together additional related works not having the keyword in their titles.

Perhaps the only realistic solution to the shortcomings of the Library of Congress Subject Headings (LCSH) is to provide users of the computer catalog with term or keyword searching. Such a technique substantially increases the number of access points and thus the number of records retrieved by a system. The use of keyword searching need not be restricted to subject headings but can also be used for author, title, notes, series, etc. searches. Additional techniques, such as the "keyword approximation search" used at the Washington University School of Medicine in St. Louis, Missouri, can be used to improve the likelihood of a user's being successful at the online catalog. Owing to the improved searches likely to result from an augmented MARC record, i.e., MARC plus the addition of the table of contents and/or index terms, serious attention should be paid to the creation, distribution and use of augmented records for use in online catalogs.

Section IX

ONLINE CATALOG USE AND SATISFACTION

This section will examine the use patrons make of the online catalog, the success they experience in using the online catalog, and their expressed levels of satisfaction with the online catalog.

Use

Users report that about half of all searches are subject searches (see EXHIBIT 33). Slightly more than one-half of the users (53.3%) indicated they conducted a subject search using a subject heading access point--the only kind of subject searching allowed by five of the six computer catalogs. Slightly more than one-third of users (36.4%) reported that they used a topic word or words for this search; in fact, the user may have used a topic word or words and entered this phrase as a partial subject heading search and achieved satisfactory results. This suggests a need of patrons to search by subject or topic which has been constrained by the time required to conduct a subject search using the other forms of the catalog.

It is interesting to examine closely the data from the Mankato State System which allows users to conduct either a keyword or term search or a subject heading search. Almost two-thirds of the

EXHIBIT 33: Type of Search Reported by Users*

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission/ West Valley %	Evanston Public %	Pikes Peak %
Subject headings	53	58	48	69	67	41	54
Topic word or words (keyword or term searching)	36	23	64	42	24	22	29
Part or a complete title	46	46	35	48	44	45	57
Part or a complete author	42	54	27	42	36	62	41
Part or a complete call number	2	2	NA	1	3	0	6

NA=Not available
*=Multiple responses may be choosen so total may exceed 100%.

Mankato users indicated they used the term searching capability of the online catalog and slightly less than one-half of the users used a subject heading search. Given a choice, users report they will more often utilize the information retrieval capabilities of a computer system through the use of keyword and term searching (64.4 percent).

The extensive use of term searching by the users at Mankato State should not be too surprising. Term searching more closely approaches the "real or natural" language people actually use in daily conversation. It is the same natural language that users bring with them as they approach and use the online catalog terminal rather than the pre-coordinate phrases used in the Library of Congress subject headings. However, the combination of term searching and subject heading searching provides a powerful tool for library patrons in that the term searching can aid the user in identifying one or more highly useful or relevent records. The subject headings assigned to these "relevent records" can in turn lead to library resources which may have been overlooked by the user because of the use of subject headings not known or remembered by the online catalog user. Within the DIALOG system, such a capability can be employed by the searcher through the use of an "EXPAND" command. A similiar command would be extremely useful to online catalog users.

Slightly less than one-half of the users used a partial or full title search (45.9%) or a partial or full author search (42.0%).

Typically author and title searches are thought of as known item searches. Yet, since the questionnaire respondent was allowed to indicate multiple responses and the totals for this question are larger than 100%, it is clear that users may be employing multiple types of searches to obtain their desired information from the computer catalog.

Available data, as shown in EXHIBIT 34, from the computer catalogs themselves confirm the large amount of subject searching being done by users. The amount of subject heading searching ranges from 37.6 percent at Pikes Peak to a high of 62.4 percent at Mission/West Valley Colleges. Title searches range from a high of 40.4 percent at Pikes Peak to 15.5 percent at Mankato State. Author searches account for no more than 15 percent in all systems.

Actual search statistics indicate that title and author searches are used considerably less than the typical user employs these search approaches when at the card catalog. It is also important to note that actual title and author searches occur less frequently than are reported by users (compare EXHIBITS 33 and 34).

The users at Mankato State have the ability to search with keywords and terms. As shown in EXHIBIT 34 the users are utilizing term searching a considerable amount, with about 45 percent of all searches entered by users being a keyword or term search.

EXHIBIT 34: Types of Searches Performed on Computer Catalogs*

Search	Claremont Colleges[1] # (%)	Mankato State[2] # (%)	Mission/ West Valley[3] # (%)	Pikes Peak[4] # (%)
Term	SNA	40,206 (36.8%)	SNA	SNA
Subject Heading	1,957 (41.7%)	20,421 (18.7)	17,589 (62.4%)	26.424 (37.6%)
Subject Term	SNA	5,423 (5.0)	SNA	SNA
Title	862 (18.4)	16,936 (15.5)	5,263 (18.7)	28,371 (40.4)
Title Term	SNA	2,849 (2.6)	SNA	SNA
Author	1,661 (35.4)	12,732 (11.6)	4,397 (15.6)	9,287 (13.2)
Author Term	SNA	373 (.3)	SNA	SNA
Author/Title	SNA	7,211 (6.6)	32 (.1)	SNA
Call Number	107 (2.3)	SNA	459 (1.6)	SNA
Course, Instructor	SNA	SNA	440 (1.6)	SNA
Other	101 (2.2)	3,235 (3.0)	- -	3,954 (5.6)
Totals	4,688 (100%)	109,386 (100.0%)	28,180 (100.0%)	70,282 (100.0%)

* Data not available for Stephen F. Austin State University Library, and the Evanston Public Library

SNA = Search Not Available

[1] = Data for month of April, 1982 for branch Science libraries; Sept. 15-Oct. 15, 1982 for Spraque Library.

[2] = Data for month of April, 1982.

[3] = Data for months of April and May, 1982.

[4] = Data for month of April, 1982.

Analysis of data collected and analyzed at Mankato State indicated that about sixty percent (60%) of the title terms entered by users are found in the subtitle portion of the title field. Therefore, keyword/term access is important in fields other than subject headings.

The computer catalog at Mission/West Valley Colleges was able to provide a magnetic tape recording all transactions entered by users. Analysis of this data revealed some interesting findings.

The expected sequence for a title or author search on the system at Mission/West Valley, as shown in EXHIBIT 35, would likely be a title inquiry, a status inquiry, and perhaps a full bibliographic display. Yet the typical search pattern is considerably different and reveals a sequence of searches which is repetitive in nature. A title inquiry (36.8%); or a status request (21.3%); or a subject search (19.0%); or an author search (12.6%). And a status inquiry will be followed by another status inquiry about one-third of the time (34.4%); or a subject inquiry (25.5%); or a full bibliographic display (13.2%). A similar pattern is observed for author searches.

The typical subject search would likely be entry of a subject heading, a request to display the titles associated with a given subject heading, and then a status request for a given title or a request for a full bibliographic record. The actual subject

EXHIBIT 35: Search Pattern for Title and Subject Searches conducted at Mission/West Valley Colleges

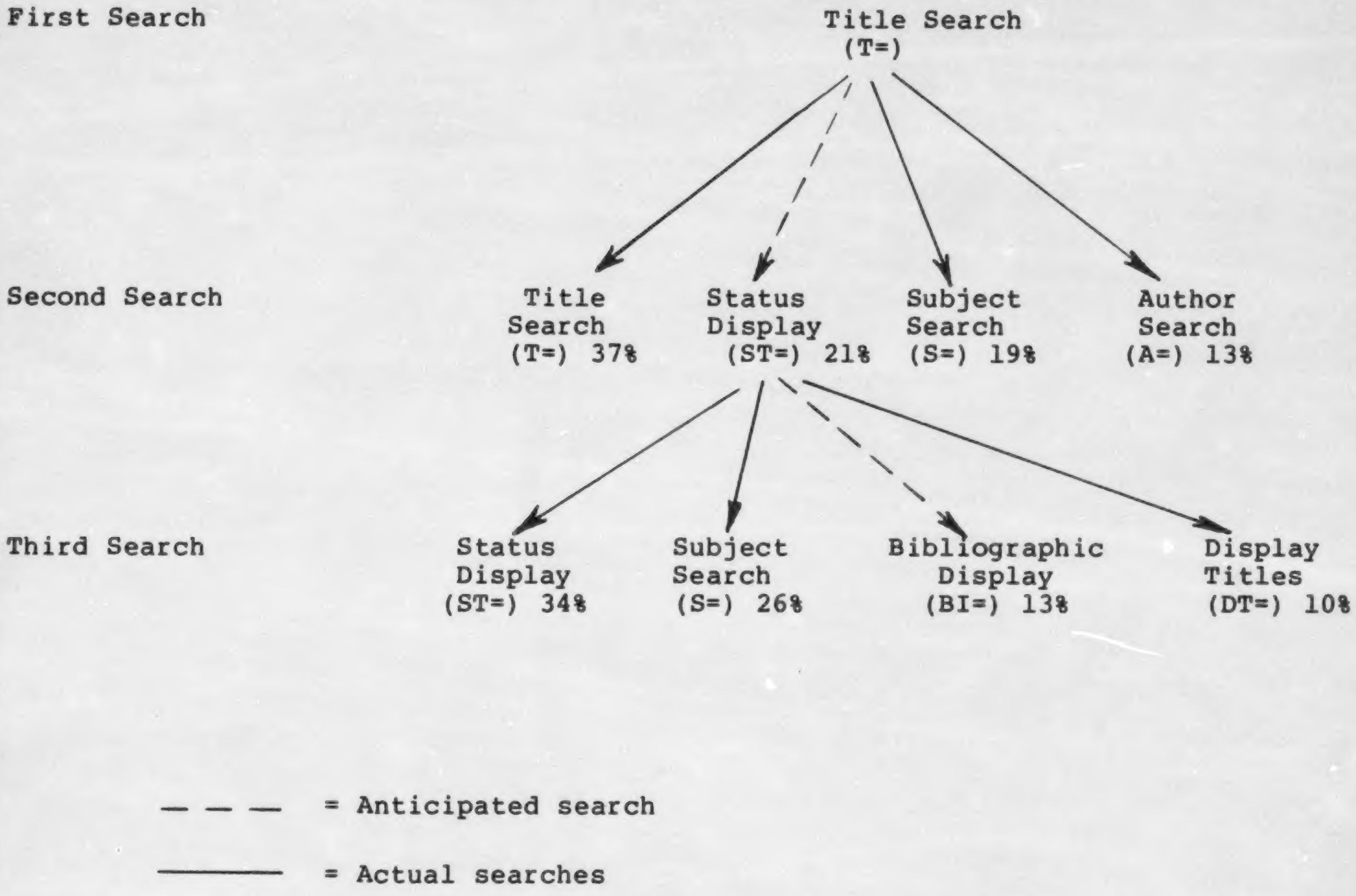
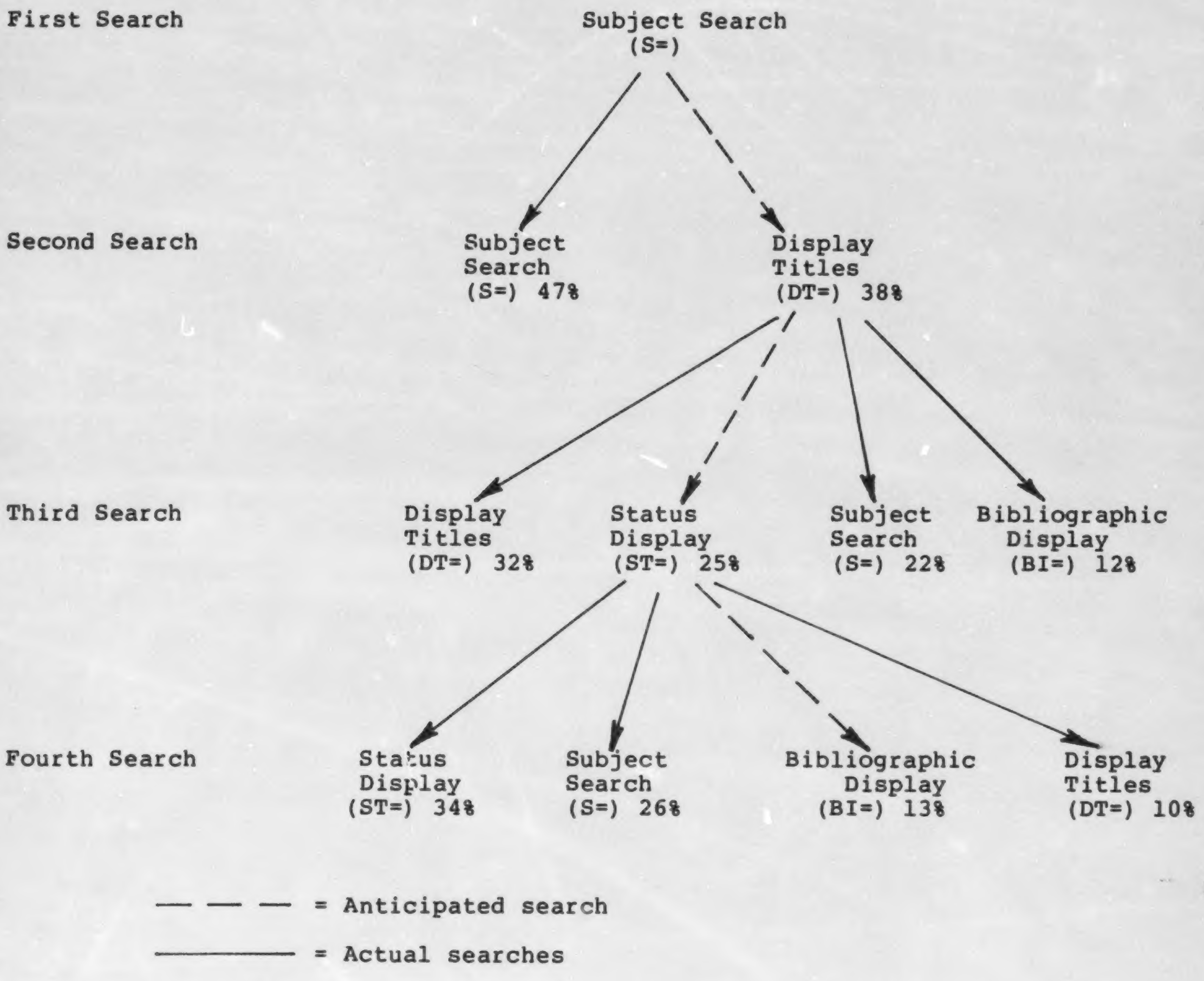

First Search
Title Search (T=)
Second Search
Title Search (T=) 37%
Status Display (ST=) 21%
Subject Search (S=) 19%
Author Search (A=) 13%
Third Search
Status Display (ST=) 34%
Subject Search (S=) 26%
Bibliographic Display (BI=) 13%
Display Titles (DT=) 10%
— — — = Anticipated search
——— = Actual searches

EXHIBIT 35 continued


First Search
Subject Search (S=)
Second Search
Subject Search (S=) 47%
Display Titles (DT=) 38%
Third Search
Display Titles (DT=) 32%
Status Display (ST=) 25%
Subject Search (S=) 22%
Bibliographic Display (BI=) 12%
Fourth Search
Status Display (ST=) 34%
Subject Search (S=) 26%
Bibliographic Display (BI=) 13%
Display Titles (DT=) 10%
— — — = Anticipated search
——— = Actual searches

search pattern, however, is also repetitive in nature and reflects a fair amount of exploration and discovery on the part of the user. Entry of a subject search request is most likely followed by the entering of another subject heading inquiry (47.3%) or a request to display titles 37.9% of the time. This seems to suggest that users of the online catalog are successful about half the time in finding an authorized form of a subject heading. Similar results were reported with users of the card catalog. A request to display titles is again most likely to be repeated (31.5%) and then the user is likely to enter a status inquiry (24.8%) or another subject search (22.0%). A status inquiry is followed by another status inquiry about one-third of the time (34.4%).

Success

The online catalog has the potential of 'failing' the user for one of three reasons: 1) the user cannot find an item sought that is in the catalog, 2) the sought item is not in the collection--a collection failure (some think that the collection failure should not be considered a catalog failure since the catalog correctly indicated that the sought item was not in the collection) or 3) the item is in the collection but not yet in the online catalog, e.g., non-print media, older materials, etc.

While the study was not able to collect objective data about the success rates enjoyed by users of the computer catalog, two questions did focus on the user's perception of the utility of the retrieved information.

About one-half of the users (42.3%) found some of what they were looking for and an additional one-fourth of the users (28.6%) found all or most of what they were looking for (see EXHIBIT 36). The remaining thirty percent of the users were evenly split between finding nothing and finding more than they were looking for. Thus, it is possible to say that 8 out of 10 users were "successful" in their search. Given that the majority of libraries in this study have yet to complete a total retrospective conversion project, the fact that about fifteen percent of the users found nothing is not too discouraging. But total "recon" must be completed quickly, it is assumed, to reduce the number of users finding nothing.

In addition, the online catalog seems to be playing a serendipity role in that about one-half the users are finding things of interest other than what they had anticipated. As the computer catalogs continue to mature and evolve by providing features such as the ability to browse indexes and authority files and to automatically link and display all records associated with a particular index term (as with the "Expand" command on DIALOG),

EXHIBIT 36: User Success with the Online Catalog

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission West Valley %	Evanston Public %	Pikes Peak %
In this computer search I found:							
Some of what I was looking for	42	41	47	57	41	34	40
All or most of what I was looking for	29	35	26	25	28	37	26
Nothing I was looking for	16	16	9	11	11	15	25
More than I was looking for	14	8	18	7	20	15	9
I came across things of interest other than what I was looking for*	50	42	55	57	51	52	41

*Percent responding Yes

this serendipity will no doubt increase. Yet, the number of pleasant "surprises" now found by users of the online catalog is indeed encouraging. And the more frequently the online catalog is used, the more likely the user will find other things of interest.

Satisfaction

A computer catalog could facilitate searching, the library could provide all the necessary training aids and physical facilities, yet the user still might not be satisfied. The operative word in the previous sentence is "might." How satisfied are users with the online catalog? To say that users have very positive attitudes towards the online catalog is perhaps the understatement of the year. As shown in EXHIBIT 37, eighty percent (80.6%) of the users found their most recent search either very satisfactory or somewhat satisfactory.

There is even more positive overall support for the online catalog itself. More than ninety percent (92.1%) of the users indicated that their general attitude toward the computer catalog was very favorable or somewhat favorable. The computer catalog with term (keyword) searching at Mankato State University elicited the most positive attitudes among users.

Not surprisingly, three-fourths of the users (75.6%) rated the computer catalog better than the card, book or microform catalog in the library (see EXHIBIT 37). Less than ten percent (7.7%) favored the non-computer form of the catalog.

EXHIBIT 37: User Attitudes Towards The Online Catalog

	JMA Aggregate %	Claremont Colleges %	Mankato State %	Stephen F. Austin %	Mission West Valley %	Evanston Public %	Pikes Peak %
This computer search was:							
Very satisfactory	46	55	53	35	50	55	31
Somewhat satisfactory	35	29	34	43	39	31	35
Somewhat unsatisfactory	11	8	8	16	8	6	19
Very unsatisfactory	9	8	5	6	3	8	15
Overall or general attitude toward the computer catalog is:							
Very favorable	68	59	79	64	78	65	81
Somewhat favorable	25	33	18	29	19	29	27
Somewhat unfavorable	6	6	3	6	3	4	12
Very unfavorable	2	2	0	1	0	2	5
Compared to the card, book or microfiche catalog in this library, the computer catalog is:							
Better	76	75	89	69	91	71	60
Equal	17	21	10	25	8	20	22
Worse	8	5	1	6	1	10	18

Increased Use of the Catalog and Collection

While not a part of this study, there is some evidence to suggest that use of the catalog and use of the collection (both in-library use and annual circulation figures) increase after the online catalog is installed. Circulation increases have been noted at Mission/West Valley Colleges, Mankato State, Pikes Peak Library and the Evanston Public Library. Similar experiences in other libraries have been reported by Moore (1981), Tiffany 1982 and Beckman (1982).

Summary Implications

Users at the online catalog do perform a considerable amount of subject searching. This is particularly true at Mission/West Valley Colleges when the user is provided with a display of valid subject headings as a result of the subject search entered by the users. Subject searching is also high at Mankato State where the user has the opportunity to use term or keyword searching. Almost half of all searches entered by users at Mankato State are for terms or keyword searching. And there are more than twice as many term searches, which retrieve the entered term(s) from the subject headings, title and author fields, than subject heading searches at Mankato State. It would thus seem that providing term or keyword searching and displaying (for browsing) valid subject headings should be mandatory requirements for any online catalog.

Certainly the provision of term searching helps to overcome some of the existing limitations associated with Library of Congress Subject Headings. Combining the strengths of both term searching and subject headings, through the use of an "Expand" command, i.e., selecting a particularly relevent document using a term search and then viewing all the records that have the same subject heading(s), would be a powerful tool for online catalog users.

Users of the online catalog seem to enjoy a high success rate in using the online catalog and are very positive in using the online catalog for a specific search and in their general attitudes toward the computer catalog.

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